GP RACING

INSIDE

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HOW SILVERSTONE MADE HIM A STAR

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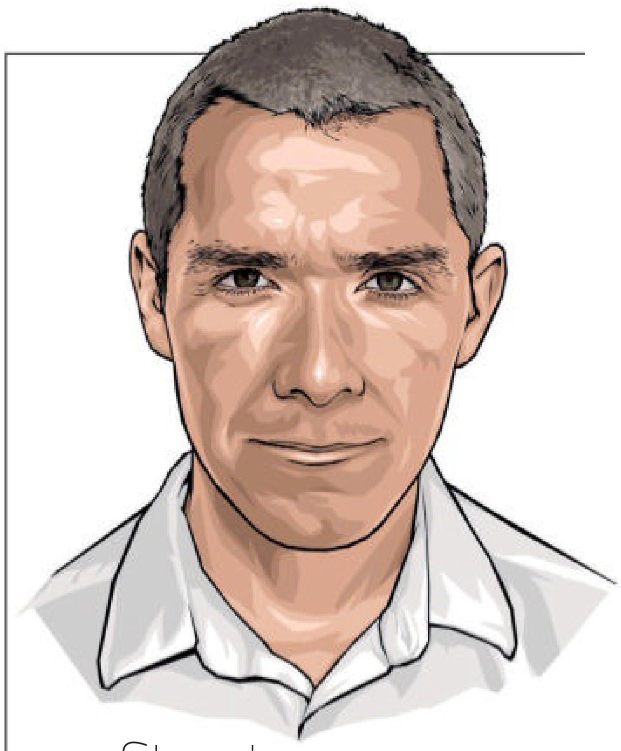
IGNITION

JULY 2023



Stuart Codling
Editor

If it's July it must be Silverstone…

Sun-drenched, soaking or somewhere in between, the British Grand Prix remains a highlight of the British sporting summer. Well, except for that time Bernie Ecclestone cynically bunked its slot down to late-April as part of his ongoing feud with the British Racing Drivers' Club, letting the spring deluges do their worst. And even then it was a decent enough race, with Heinz-Harald Frentzen in the mix from a front-row start and David Coulthard coming through to win for McLaren (though you might not have been so enthused at the time, had you needed a tow out of a muddy car park).

This month we look forward to the annual jamboree at Silverstone by speaking to all three flag-carrying British drivers. Nobody has won as many British GPs as Lewis Hamilton and, if his chances of notching up yet another victory here (to add to his tally of eight) are somewhat more remote than they were in Mercedes' pomp, he receives no less of a boost from his adoring home crowd. Both George Russell and Lando Norris have observed, too, that it's a knowledgeable crowd as well as a passionate one. During our meet-up with Lando in Monaco (p32) he reflected on his first British GP as a Formula 1 driver and being taken aback at how much support he had despite being a rookie: "I knew I had a following on social media but to see all those people cheering me on in the flesh, well, that was something else entirely," he said.

In the bad old days when the race promoter was regularly at loggerheads with Formula 1's commercial chief, the wonga-wangler in question – Bernie – famously described the British Grand Prix as "a country fair masquerading as a world event" during a fit of pique after his driver got lost on the way in. In the 21 years since that utterance was committed to the records, Silverstone has transformed its offering – to the extent that F1 is now consulting with the promoter as it gears up to promote the forthcoming Las Vegas GP itself. And that communication is a two-way process: "I will be going with a pen and paper," said Silverstone MD Stuart Pringle back in April. "I'll find it fascinating to see how they tackle it. We recognise that Americans do sports entertainment much better than we do in Europe. Just because we've been doing this [at Silverstone] for 73 years, we're not above learning off other people…"

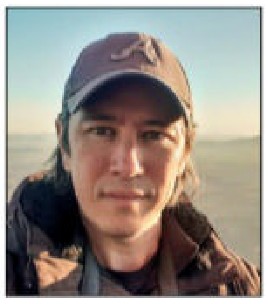
And of course, there's more than just racing going on. Gigs featuring internationally renowned music artists such as Calvin Harris, Jess Glynne, Cat Burns and the Black Eyed Peas start on the Thursday night – and of course there's the *GP Racing* fan village in nearby Whittlebury Park. Do drop by if you are staying with us and join in, come rain or shine…

***GP Racing* has a podcast!**
Search for 'Flat Chat with Codders' in your podcasting platform of choice

Contributors

OLEG KARPOV
This month Oleg discovers George Russell's Silverstone memories (p44) and also pays a visit to helmet maker Schuberth (p54)

ANDREW BENSON
BBC Sport's chief F1 writer investigates whether overtaking has become more difficult this year and what can be done about it (p62)



ANDREW FERRARO
A quick jaunt over to the delights of Monte Carlo for Andrew to capture Lando Norris for our main feature (p32)

JAMES NEWBOLD
James, *Autosport's* Plus editor, has looked at why a plethora of talented drivers only managed a solitary season in F1 (p82)

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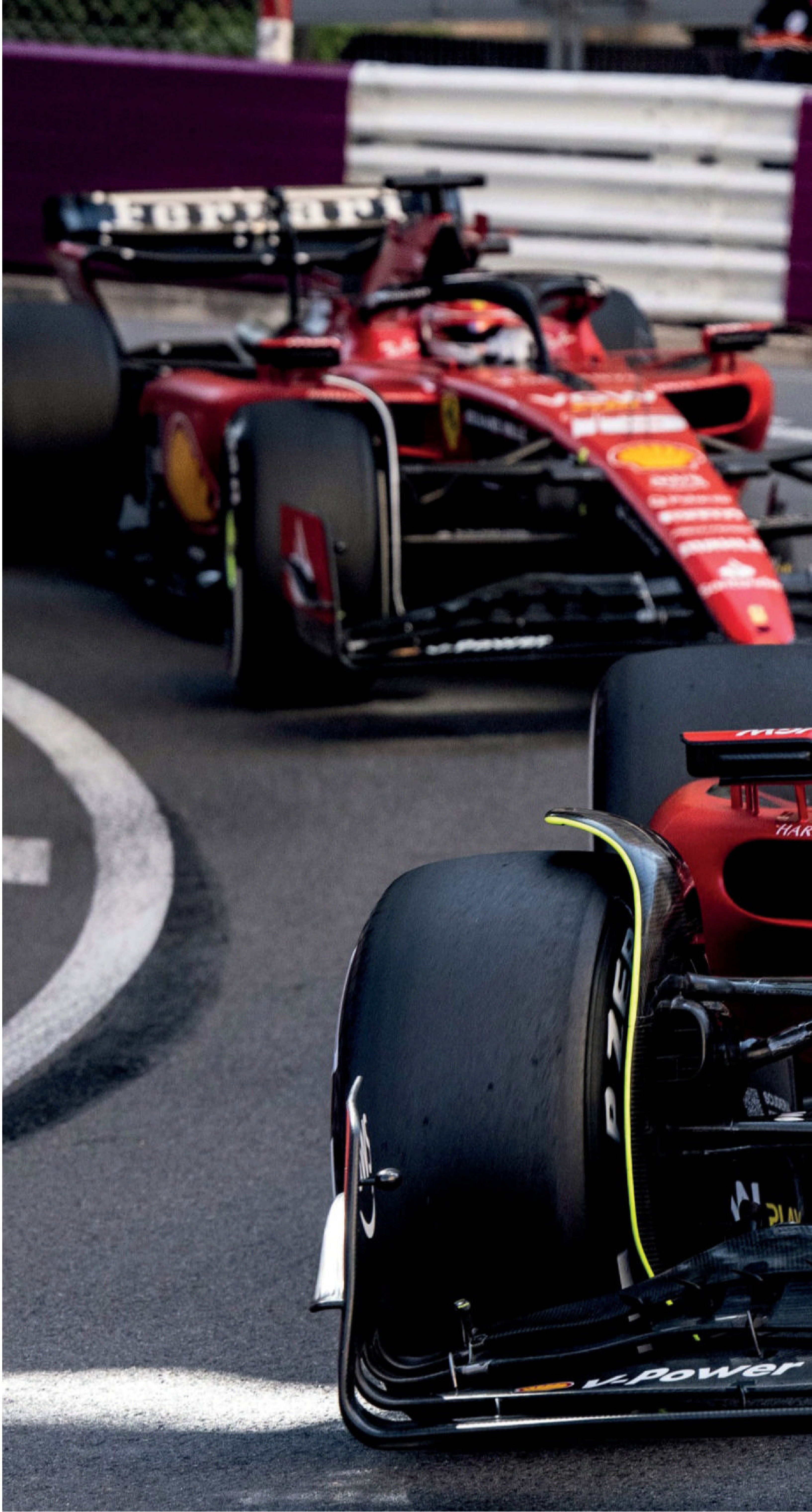
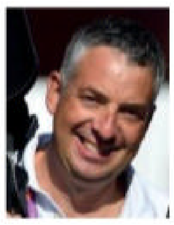


Hopes about to hit the wall

In Monaco you spend a lot of time in traffic – even if you're a top-flight racing driver. When all 20 cars are on track it can get pretty cluttered and, as a photographer, you're aware that you need to plan for more than one car to be in the frame.

This is one corner where you can shoot across, there's no fence in the way, and you can accommodate two cars in the composition if they're close enough. It's quite dynamic because the leading car is pointing right at you. At this point in the session the two Ferraris were looking like they might be able to offer Max Verstappen a challenge, then Carlos put it in the barriers.



Photographer
Simon Galloway

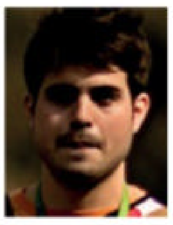
Where Monte Carlo, Monaco
When 5:10pm, Friday 26 May 2023

Details Nikon Z9
70-200mm lens, 1/2000th @ F3.5

A high-stakes game in prospect

Shooting the grid in Monaco is often a case of smash-and-grab because it's one of the tightest grids in the calendar and attracts the biggest contingent of celebs, hangers-on, and journalists trying to appear in the background of Martin Brundle's televised grid walk.

As Aston Martin's photographer I had to document the team's front-row slot but after I'd captured the wide angles of Fernando arriving at P2 I tried a few more experimental shots. This was taken with a 50mm prime lens as Fernando took his helmet off. It's exposed so almost everything else is washed out and you see the intensity on Alonso's face as he gets 'in the zone'.



Photographer
Zak Mauger

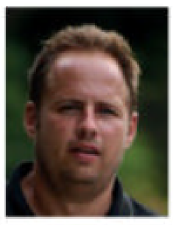
Where Monte Carlo, Monaco
When 2.19pm, Sunday
28 May 2023

Details Canon EOS-R3
50mm lens, 1/2000th @ F1.2

The late light fantastic

This year we had some quite late track sessions in Monaco so that meant potentially longer shadows, given the high-rise nature of the environment. This is the exit of the tunnel just before the track pitches downwards to the chicane.

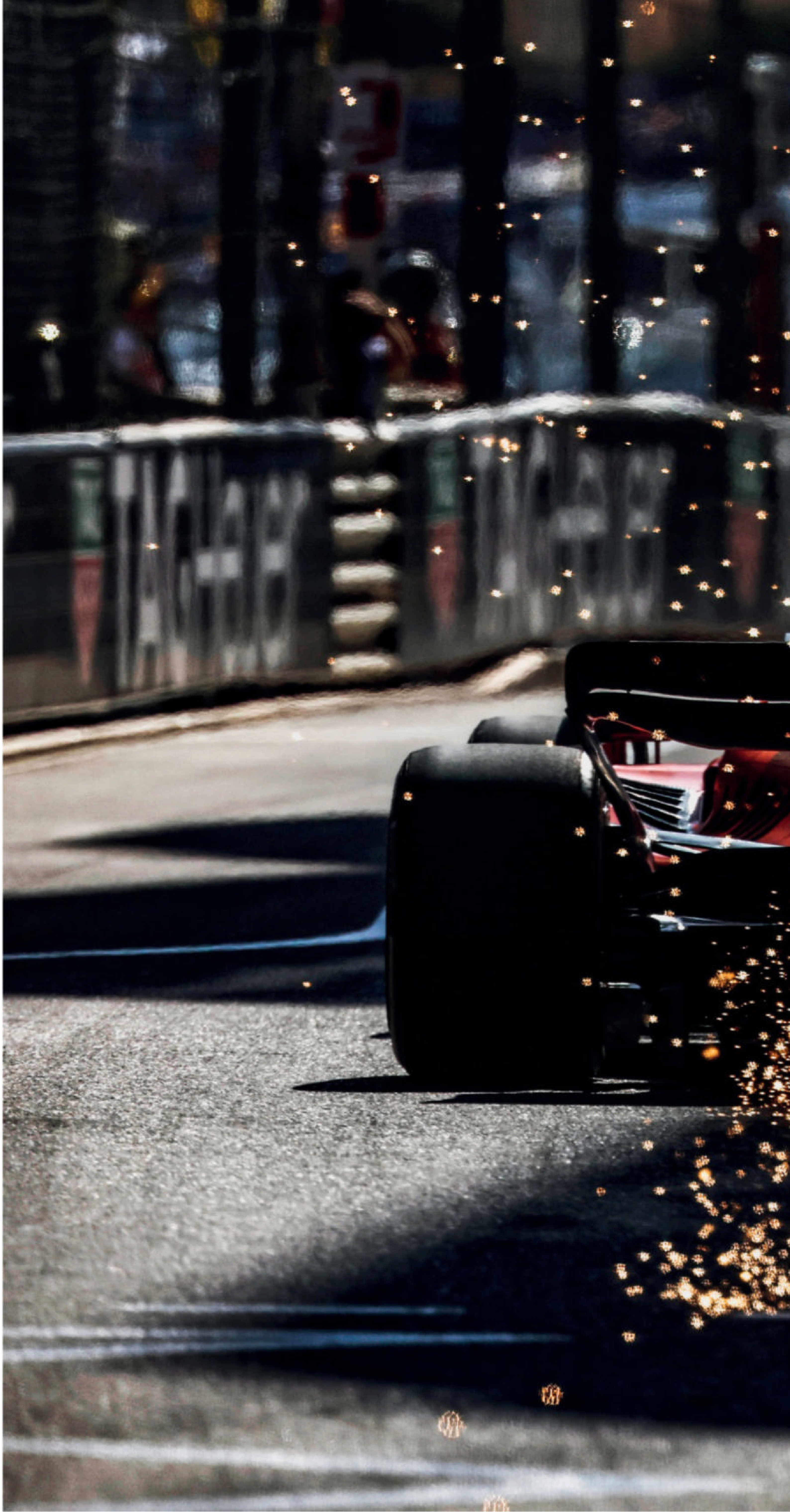
I initially set up to shoot the cars head on, because most of them (especially the Red Bull) are kicking up fewer sparks than they were last year. Then when I saw the Ferrari sparking I quickly moved to a different position. Canon's new 100-300mm F2.8 lens gave me a different take on focal length so I was able to shoot a little bit looser. Having the sparks in the shadow created quite an interesting effect.

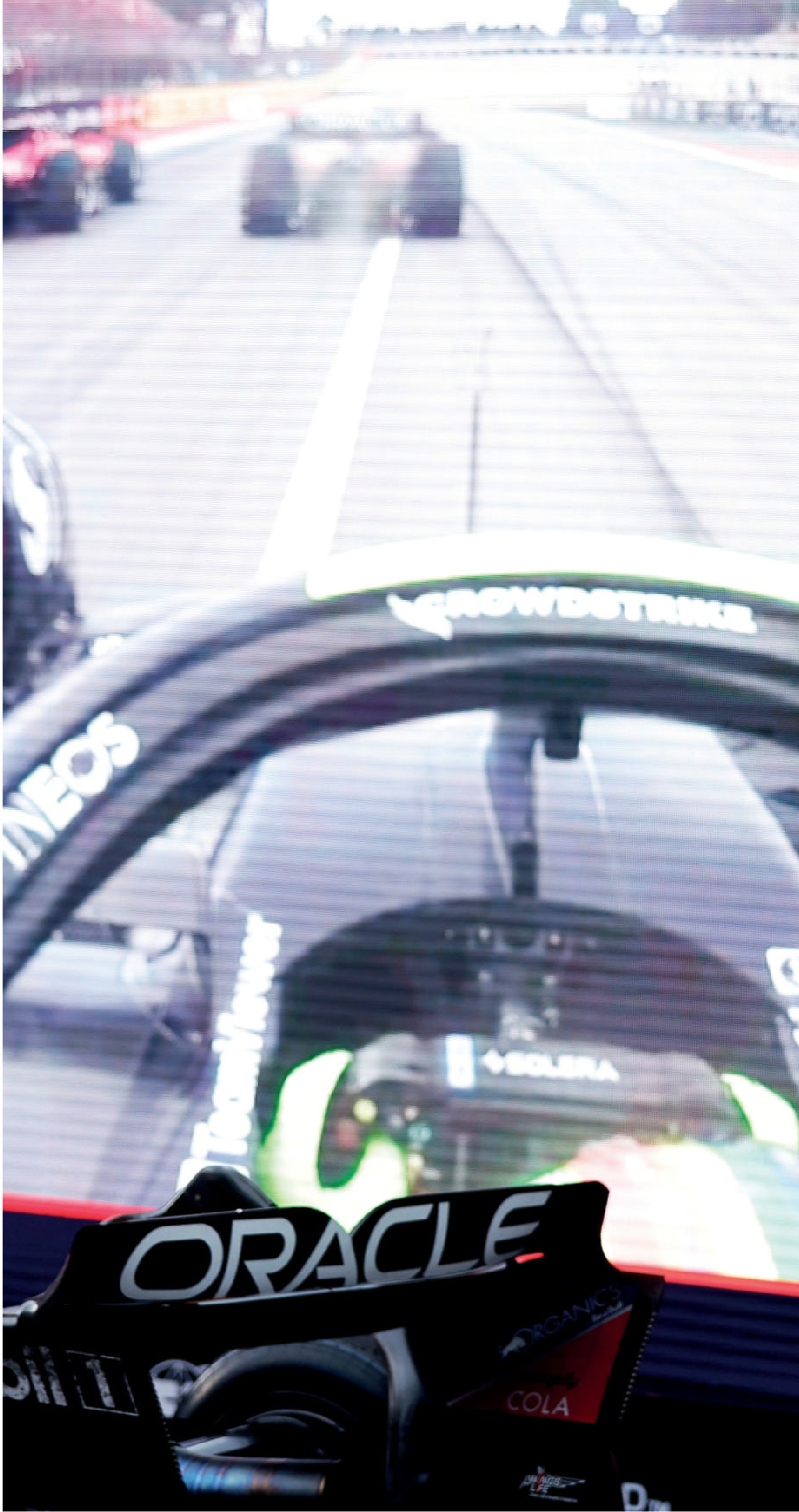


Photographer
Glenn Dunbar

Where Monte Carlo, Monaco
When 5:05pm, Friday 26 May 2023

Details Canon EOS R3
100-300mm lens, 1/8000th @ F5





"Here's where I cut up Carlos..."

One of the things I've noticed about the new generation of Formula 1 drivers is that they all seem to get along with each other quite well – out of the cockpit at least. Once the visors are down it's another matter.

This was quite a nice moment in parce fermé after the Spanish GP while Lewis Hamilton was being interviewed and Max Verstappen and George Russell were chatting about the highlights package being played on the big screen. In (recent) times past, drivers like these would just have hung around not acknowledging one another.

Another bonus is that it's a clean shot without the umpteen officials, mechanics and TV cameramen in parc fermé...

Photographer
Steven Tee

Where Barcelona, Spain
When 4.38pm, Sunday
4 June 2023

Details Canon EOS R3
70-200mm lens, 1/100th @ F3.2

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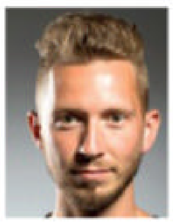
Cloudy, with a chance of showers

It was beginning to spit with rain at the beginning of FP3 in Barcelona and I was shooting across the final corner with a 500mm lens on a monopod. Normally you would be pretty static because it's a cumbersome piece of kit but I began to practice tracking the cars as they came past in anticipation of one of them going off here. The deletion of the chicane has made this corner faster and trickier.

I had two trial runs before Logan Sargeant gave me a go at doing it for real – popping his right-front wheel onto the inside kerb spat him off into the gravel and I followed the full sequence. High adrenaline and heart rate for us both, I'm sure!



Photographer
Andy Hone

Where Barcelona, Spain
When 12.38pm, Saturday 3 June 2023

Details Canon EOS-1D X MkIII 500mm lens, 1/640th @ F4.5

01 U-TURN IF YOU WANT TO

Honda rows back on decision to quit Formula 1

WHY HONDA ISN'T LEAVING AFTER ALL

01 **Having decided to withdraw** from Formula 1 less than three years ago – but never really leaving it entirely after all – Honda announced it will be making a full returnn when the new engine regulations come into force in 2026. This time, its partner will be the Aston Martin team.

Confused? Just think of the saga as a very late course correction as Honda tries to avoid replicating its failure of late 2008, when it abruptly pulled the plug on its F1 project. The car its team had spent that year developing behind the scenes brought Jenson Button the 2009 title and the renamed Brawn GP the constructors' championship.

Despite a number of familiar plotlines the story panned out differently this time. As with the late 2000s, Honda endured several seasons in which repeated failures led senior management to question the wisdom of persisting in F1. This time around, however, Honda's circumstances changed between it announcing its withdrawal and having to go through with it. During the 2021 season, which was to be Honda's last in F1, new floor regulations helped Honda-engined Red Bull to close the gap on Mercedes, and then the controversial actions of race director Michael Masi delivered the title to Max Verstappen in the season finale.

EITHER WAY, THE ASTON MARTIN DEAL LOOKS LIKE THE BEST HONDA COULD HAVE HOPED FOR

It was a happy ending, but there's no denying Honda missed out on the full benefit of Max's triumph: for most of the first season of the number 1 adorning the nose of the Dutchman's Red Bull the Honda logo was absent. Moreover, a decision that seemed ill-advised from the outset appeared more foolish in the light of Red Bull's resurgent winning streak and the growing popularity of F1. While other manufacturers were weighing up options to enter grand prix racing, Honda was walking away from a partnership with the best team and biggest new star in F1.

After coming very close to selling the intellectual property of its own designs, Honda quietly began to unpick its decision. The logos returned to Red Bull's cars in the autumn of 2022 – but instead of enjoying equal partner status through years of dominance, the company is now essentially relegated to supplier status.

And while Honda will remain in that position until the end of 2025, its own hasty decision has deprived it of the opportunity to partner with Red Bull in the future. The team had already invested in its own powertrain division and gone looking for other potential partners; Porsche slipped through the net but Ford has now inked a deal to badge the Red Bull power units.

Honda has therefore gone looking elsewhere and done a deal with Aston Martin, partnered by the ambitious Lawrence Stroll, who is keen to fight and beat his current engine supplier – Mercedes – on track. The company's explanation for its own U-turn is that F1's now-confirmed decision to switch to 100% sustainable fuels and increased electrification for the 2026 engines is in line with Honda's own goals. Certainly in October 2020, when announcing Honda's withdrawal from F1, the

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Aston Martin has opted for a partnership with Honda from 2026. This will bring to an end years of using customer engines from Brackley as, in its various guises, the Silverstone team has used Mercedes power units since 2009

02 McLAREN'S MARSHALL PLAN

Woking poaches key engineer from Red Bull

Honda's global CEO Toshihiro Mibe and Aston Martin owner Lawrence Stroll announced the deal in Tokyo at the end of last month

PICTURES: ZAK MAUGER; MARK SUTTON; HONDA

The power units in this year's Red Bulls are badged as Hondas, but the Japanese company missed out on a deal from 2026 onwards

company bosses spoke of the need to prioritise carbon-neutral projects in the automotive sector.

In announcing the change of plans two and a half years on, Honda Racing Corporation president Koji Watanabe said: "The biggest key factor for this decision [to commit to 2026] for us this time around was the direction that the new 2026 regulations are facing towards, which is moving towards carbon neutrality.

"That direction was matched with our company's goal moving into the future. That is the decisive key factor. So currently, the electrical power accounts for 20% or less, as opposed to the internal combustion engine, but the new regulation would require about 50% or more of electrification, which would move even further towards electrification. I believe the technology for electrification would be useful for us in mass-manufacturing EV vehicles. And the 2026 regulations would obligate us to go 100% towards carbon-neutral fuel."

Very plausible – except F1's plans to switch to sustainable fuels have been known since the end of 2019…

Either way, the Aston Martin deal looks like the best Honda could have hoped for after failing to find a satisfactory option to continue with Red Bull. Aston's championship ambitions are backed not only by investment – the team moved into a new factory in late spring and continues to develop its infrastructure – but also by results on track.

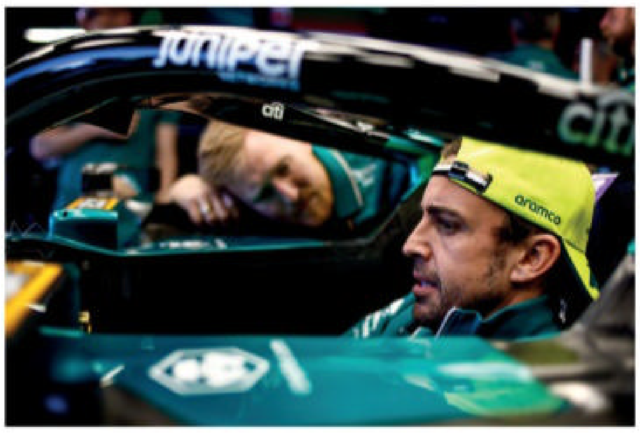
It's also understood to be a more financially viable project ▶

for Honda, which has spent hundreds of millions of dollars during its years with McLaren and Red Bull. It's not just the fact that the engine manufacturers will now be working within their own cost cap, but the terms of the deal with Aston Martin are also apparently attractive.

For Aston, the Honda deal is the latest element in the creation of a structure capable of fulfilling boss Lawrence Stroll's title aspirations, by shedding its current customer status and becoming a de facto works team. Honda's experience of recent years should act as insurance against any unexpected difficulties at the start of a new cycle.

There is one uncomfortable detail in this idyll, however, and that is Fernando Alonso. The Spaniard is enjoying a fantastic first season with Aston, but the wounds to Honda's image from their last period together – although healed to an extent by Honda's subsequent successes in F1 – might never be fully cured. And although Alonso will be 44 by the start of 2026, his current form suggests he's still one of the best drivers in F1, and his motivation hasn't waned. The possibility of Alonso wanting to stay with the team beyond 2025 cannot be ruled out. But the idea of reuniting with the driver who famously described Honda's PU as a "GP2 engine" during the company's home race at Suzuka in 2015 is unlikely to be greeted with enthusiasm in Tokyo.

Publicly, Honda bosses aren't particularly intimidated by the prospect. "We have been accelerating our development during our recent time in Formula 1 while working with Alonso, and that enabled us to win the world championship," said Watanabe. "The selection of drivers is up to the team to decide. So, if the team decides we'll have Alonso as a driver again, we will have no objections whatsoever on him driving.



Alonso could still be with Aston Martin come 2026 but the Spaniard has some 'history' with Honda from his time at McLaren

Rob Marshall has been at Red Bull since 2006 but will move to McLaren for the start of the 2024 season

McLAREN BOOSTS ENGINEERING STRENGTH

02

After discovering early on in the development of its MCL60 that it was falling short of its targets, McLaren realised it had a tough 2023 season ahead. But if there was any positive news in that revelation, it's that it confirmed a windtunnel upgrade isn't all the team needs to get back on top in F1.

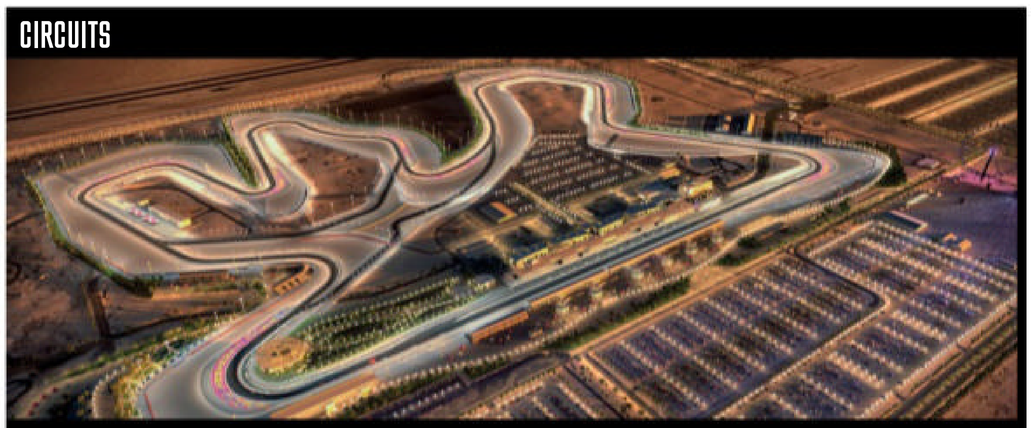
Since the beginning of the year McLaren has been restructuring its technical department and the latest move has been to poach Red Bull's chief engineering officer Rob Marshall. He will join the Woking team in January 2024 as technical director in charge of engineering and design.

Marshall has been a key member of Adrian Newey's team almost from the start of Red Bull Racing's history in Formula 1, joining the Milton Keynes-based outfit in 2006. Prior to that, Marshall had worked for Benetton during its heyday in the mid-1990s and remained with the team when it was acquired by Renault in the early 2000s.

He will now be part of a trio of chiefs in the technical department at Woking, restructured following the ousting of James Key. Marshall will work alongside another former Red Bull engineer, Peter Prodromou, who joined ▶

NEWS IN BRIEF... NEWS IN BRIEF...NEWS IN BRIEF...

CIRCUITS



RESURFACING, plus new pit boxes, VIP areas, car parks, fan zones, media centre and race control building are all part of the upgrades to the Losail International Circuit, host of the Qatar GP. A future street circuit in Doha now seems unlikely.

TYRES

The tender process for F1's tyre supply from 2025-2027 has closed and it is rumoured Pirelli is facing competition from Bridgestone. Approved bidders were due to be announced on 16 June, after this issue of *GP Racing* went to press.

RACES

The South African GP will not appear on the 2024 F1 calendar after talks between F1 and interested stakeholders ended.

TEAMS

McLaren is switching its new composites department to its old factory in Albert Drive, Woking, two miles from the MTC, with some of the team's heritage collection going the other way.

PEOPLE

Haas team principal Guenther Steiner was reprimanded by the Spanish GP stewards for his remarks on the penalty given to Nico Hülkenberg by the Monaco stewards.

PICTURES: RED BULL CONTENT POOL; ZAK MAUGER; QATAR GP

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F1 INSIDER

McLaren in 2014, and ex-Ferrari man David Sanchez, who will join the team with Marshall next January.

Marshall's parting of ways with Red Bull was, unusually for F1, rather amicable. Red Bull team principal Christian Horner and McLaren CEO Zak Brown negotiated the deal behind closed doors before the announcement.

"Usually, when somebody leaves the team, we tell them to fuck off! With Rob, it's a little bit different," joked Horner, paying tribute to his soon-to-be former colleague. He also pointed out that Marshall hasn't been involved in the day-to-day running of the F1 team in recent years, concentrating on longer-term projects, most notably helping to set up Red Bull's new powertrain division.

"He's been an instrumental player in the building of Red Bull Racing," Horner added. "But over recent years he's moved on to other projects and hasn't been in the mainstream of F1. And after 17 years, he had a significant offer from McLaren. While he still had a period of time left on his contract he was keen to go back into F1 – and so we've come to an agreement with him and I negotiated a deal with Zak that worked for everybody."

Reigning world champion Max Verstappen echoed his boss's sentiments. "Of course, we would have preferred to keep him," Verstappen said, "but when you know what he was offered by McLaren... then I do understand that he goes there for a few years. Then he can go fishing or do some nice things after that."

The opportunity to recruit Marshall put McLaren in a somewhat awkward position, after having previously announced the appointment of Neil Houldey, who has been with the team since 2006, to that same job title. Houldey will now take on the role of Marshall's deputy.

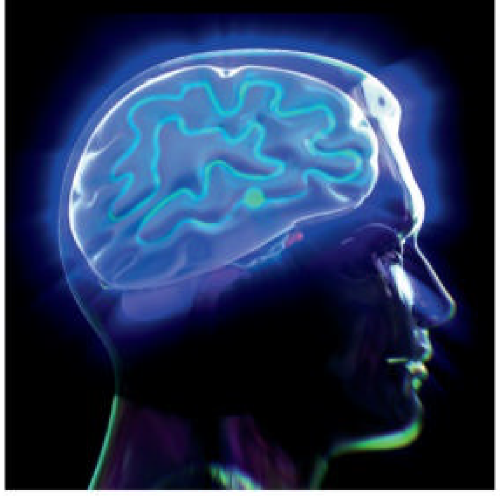
Team principal Andrea Stella praised Houldey for being a "team player" in what must have been an unpleasant situation for one of McLaren's longest-serving employees, but insisted the opportunity to get Marshall was "unmissable".

With Sanchez and Marshall soon to join, Stella said McLaren's technical structure is now "well set and quite strong", suggesting no further announcements are in the offing. Nevertheless, the recruitment of such a senior figure from what is currently the best team in F1 has to be seen as a confirmation of McLaren's ambitions, especially as it needs to hold on to Lando Norris. Despite his public support for the team at a difficult time, Lando must by now have begun to question whether tying his future McLaren was the right thing to do.

Key, meanwhile, is heading back to Hinwil as technical director for the Sauber-run Alfa Romeo team. Technical director at Sauber from 2010-2012, before moving to Toro Rosso, Key is seen by former McLaren team principal and now Sauber CEO Andreas Seidl as the man to lead the team's technical side, as it continues to prepare ahead of becoming the works Audi operation in 2026. Key will start his role on 1 September, taking over from Jan Monchaux.

WITH SANCHEZ AND MARSHALL SOON TO JOIN, STELLA SAID McLAREN'S TECHNICAL STRUCTURE IS NOW "WELL SET AND QUITE STRONG"

James Key, released by McLaren to make way for its recent hirings, is off to Sauber as technical director



F1 MASTERMIND

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Q1 How many times has Lewis Hamilton won the British Grand Prix?

Q2 Which was the last season when more than two team won at least five races?

Q3 Which driver has been classified finishing 17th in four of the first seven races of 2023?

Q4 Up to and including the Spanish GP, there are three current drivers who have only led a single race in their F1 careers. Who are they?

Q5 Lando Norris has raced in five GPs at Silverstone but what is his best finishing position?

Q6 Who am I? I started 30 GPs between 1964 and 1974 as a driver/entrant and for Reg Parnell, Tyrrell, McLaren and Shadow, winning twice.

Q7 Which five circuits hosted a race in 2020 having not held a race the year before?

Q8 True or false: Alan Jones won the first and last races of both the 1980 and 1981 seasons.

Q9 How many times did Indianapolis host the US GP when F1 returned to the circuit from 2000 onwards: 8, 9 or 10?

Q10 Niki Lauda, James Hunt and which five other drivers won races in the 1976 season?

1 8 **2** 2010 (Red Bull 9, Ferrari 5, McLaren 5) **3** Lando Norris **4** Alex Albon, Pierre Gasly, Lance Stroll **5** 4 **6** Peter Revson **7** Imola, Istanbul, Mugello, Nürburgring, Portimão **8** True **9** 8 **10** Clay Regazzoni, Jody Scheckter, Ronnie Peterson, Jacques Laffite, Mario Andretti

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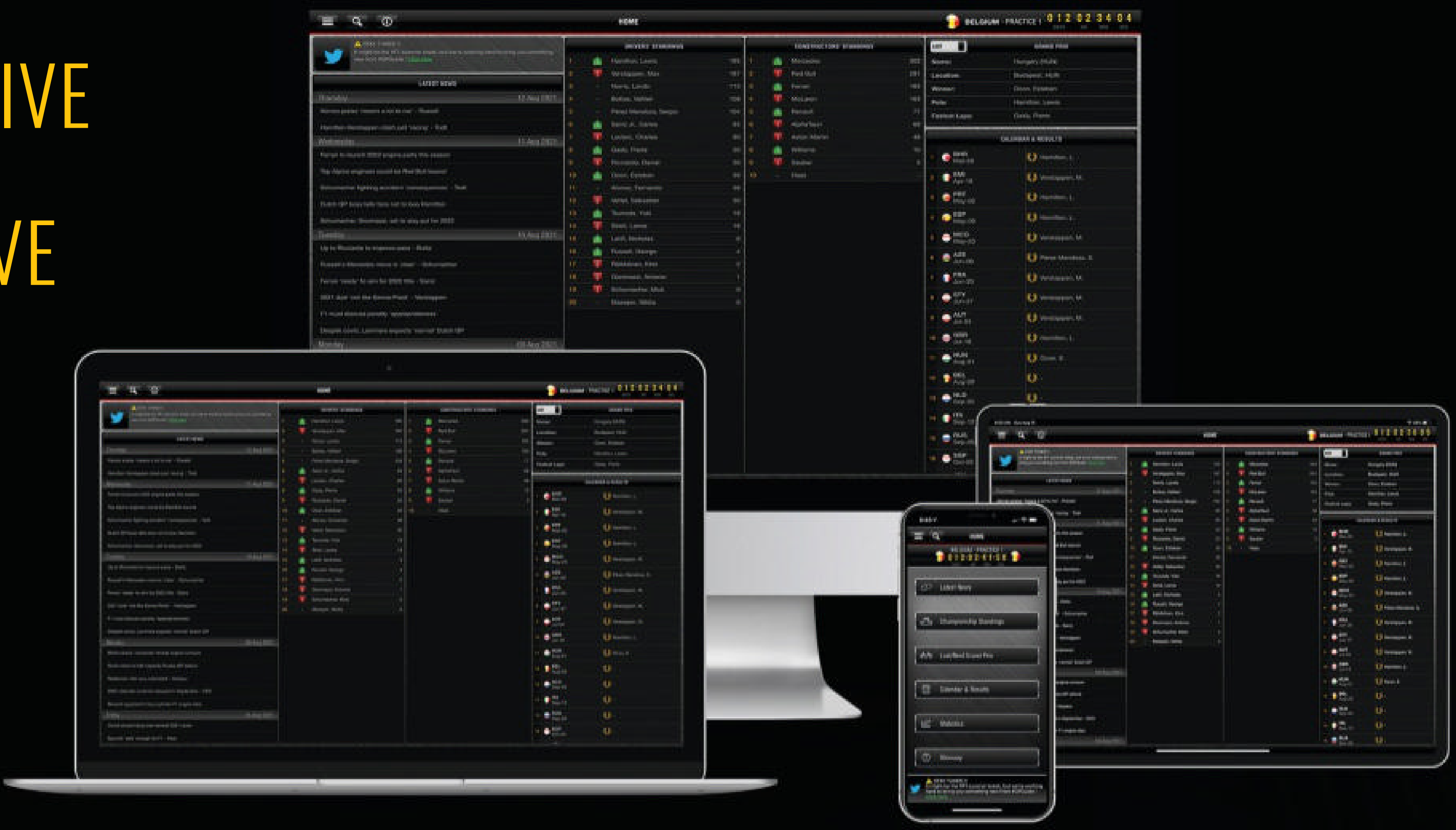

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THE F1 ANALYST

BEN EDWARDS

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PICTURES motorsport IMAGES

A BIG SUMMER FOR TWO GREAT BRITISH NAMES

Celebration of Formula 1 in the UK reaches a peak during two weekends in July. The British Grand Prix at Silverstone is followed by the Festival of Speed at Goodwood which this year provides anniversaries for two major teams. The Lotus brand was created by Colin Chapman in 1948 and, while the company is no longer playing a part in F1, there will be plenty of key single-seaters to honour the 75th anniversary of one of the most imaginative constructors in motor racing.

15 years after Chapman's launch, the young New Zealander Bruce McLaren set up his own team. As a result, the McLaren brand is second only to Ferrari in terms of ongoing duration in F1, and the two teams are top of the list for British GP wins. Having switched from McLaren to Ferrari in 2021 Carlos Sainz took his first F1 victory at Silverstone last year and, suitably, the previous Ferrari driver to win at Silverstone, Sebastian Vettel, will be driving a McLaren at Goodwood.

The MP4/8 is part of Vettel's personal collection and was raced by Ayrton Senna in 1993. While that season didn't yield quite the level of success McLaren was accustomed to, having claimed seven drivers' titles in the previous nine years, it was memorable for many reasons. Senna laid down an opening lap for the ages on his way to victory in the European GP at Donington, the second of his five wins that year; and Michael Andretti re-established a connection to the USA, something which had been a key element of the team's early days.

Founder Colin Chapman in one of his many Lotus creations. The brand celebrates its 75th anniversary this year

McLaren was an impressive racer and engineer and became a works driver for the Cooper F1 team in 1959. He took his first world championship F1 win at the inaugural US GP when he was 22, becoming F1's youngest-ever winner at the time. But there wasn't a huge crowd to watch his moment of glory at Sebring; as Bruce wrote in his biography *From the Cockpit* in 1964, "The first US GP in 1959 had been poorly supported by the public, largely because F1 racing there was and still is virtually unknown." Thankfully, that is a pattern which has been redefined in recent years.

Bruce enjoyed racing in America, particularly in the mid-engined sportscars created by his company for the Can-Am series which McLaren dominated between 1967 and 1971. Can-Am earned top teams big money, enough to help support the financial aspect of F1 at the time. Sadly it was a Can-Am car which also led to the loss of Bruce in testing at Goodwood in 1970, yet the team he had created continued to deliver remarkable results. In 1974 under the leadership of American-born Teddy Mayer, McLaren claimed its first F1 drivers' and constructors' titles courtesy of Emerson Fittipaldi.

Competing at the Indy 500 was also a major part of the plan in the early 1970s and a McLaren first won the event under the command of Roger Penske's separate team in 1972. By 1976, Johnny Rutherford had taken his second win at Indy for the works McLaren team and that year proved to be a highlight for the company as James Hunt won the F1 drivers' title by one point from Niki Lauda.

The late 1970s were more challenging and within a few years the team was under the command of Ron Dennis. By then, F1 was the focus yet there were still strong connections with the States. Dennis brought London-born John Barnard back from California where he had been chief designer for Vel's Parnelli Jones Racing. Barnard designed a carbonfibre monocoque for the McLaren MP4 and, thanks to some of the connections he had, a deal was put together with Hercules Aerospace based in Delaware to construct a chassis that became a key part of raising the team back to the top.

Suitably, it was Silverstone in 1981 that provided the stage for a first win for a carbonfibre based car as well as the team's first victory in nearly four years as John Watson celebrated a special moment in his career. It was the beginning of a truly remarkable period carrying Niki Lauda, Alain Prost and Ayrton Senna to numerous titles into the early '90s. While his year with McLaren didn't quite work for Michael Andretti, perhaps a second era in F1 remains on the horizon as a team boss.

McLaren continued with more wins in the late '90s, taking Mika Häkkinen to two titles and then a first for Lewis Hamilton in 2008. Recently the team has been through more challenging times, yet American chief Zak Brown has in many ways taken on Bruce's style of expansion. IndyCar, Formula E and Extreme E are all part of an operation partly defined by F1's cost cap and the need to stretch elsewhere. A fabulous fortnight is on the way, as team and supporters celebrate 60 years of immersion in motorsport and connections across the Atlantic. Let's raise a glass.

McLAREN
GOODYEAR
66

America had always been important for Bruce. Two years after his death a McLaren, run by Penske, won the Indy 500

POST n° 5
TOTAL
TOTAL

Bruce McLaren founded his team in 1963 but was, at the time, still a works driver in F1 for the British manufacturer Cooper

Lewis Hamilton's first world title in 2008 remains McLaren's last championship success

McLaren
Shell

Sebastian Vettel will be demonstrating his ex-Ayrton Senna McLaren MP4/8 at Goodwood's Festival of Speed in July

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In 1974 Emerson Fittipaldi led McLaren to the first two of its 20 championship crowns

West McLaren Mercedes
Marlboro
P2
P1

After a fallow period in the mid '90s, McLaren roared back with two titles for Mika Häkkinen

Miss SEBRING

Bruce's first world championship F1 win came on US soil in the inaugural US GP in 1959

PICTURES: MOTORSPORT IMAGES ARCHIVE. ILLUSTRATION: BENJAMIN WACHENJE.

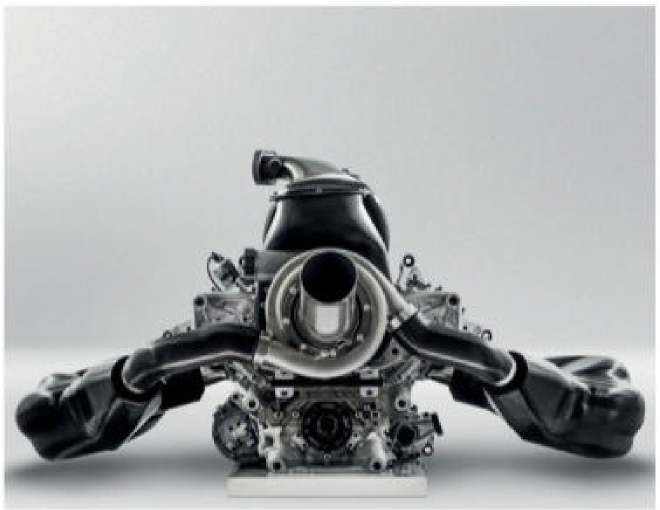
UNDER THE HOOD

PAT SYMONDS

PICTURES motorsport IMAGES

SHEER MAGNETISM: HOW A MOTOR GENERATOR WORKS

Last month we looked at batteries and acknowledged there are many different types of devices which fit that generic term. This month we take a similar look at one of the other major components of a hybrid system: the motor or, as it's known on a vehicle, the motor generator unit or MGU. The motor is the device that converts electrical energy to mechanical energy. It's a reversable process and so, if driven, a motor can also turn mechanical energy into electrical energy as it acts as a generator, hence the name MGU. Motors consist of many parts but the primary ones are the rotor in the centre, which turns and provides motion, and the stator which surrounds it and is non-moving.



Formula 1 engines underwent a huge change for 2014 with the adoption of a hybrid system containing motor generator units (MGUs)

We know batteries store electrical energy as direct current. The poles of a battery are always either positive or negative, so one might think that the logical type of motor to use with a battery is a direct current or DC motor. For years this was the case – and in fact for much of the 20th century the UK had the highest number of electric vehicles of any country in the world, due to the large number of electric urban delivery vehicles which delivered milk to households every morning. The majority of these used lead acid batteries connected together to give 60 volts and drive a DC motor.

The DC motor, while simple to control, required a lot of maintenance since the current was delivered to the rotor via sprung-loaded carbon brushes which needed frequent replacement.

All modern electric vehicles use alternating current (AC) motors. But even in this generic name lie many different configurations. The simplest form of AC motor is the induction motor. In an induction motor the rotor is an arrangement of conducting bars. The stator has windings of copper wire through which an alternating current passes, creating a magnetic force. The current is switched at high frequency using solid-state switches known as IGBTs. This switching action causes the magnetic field to rotate and hence the induced current in the rotor produces a rotating force or torque. This type of motor is used on the front axle of the Tesla Model S and has the advantage of not needing the rare-earth magnets found in other motors, but its efficiency doesn't match that of the more common type of motor.

Most vehicles, including Tesla on the rear of the Model S, and all round in most other vehicles, use a motor known as a permanent magnet synchronous motor (PMSM). This type of motor is also used in all motorsport applications, including the kinetic and heat MGUs on current Formula 1 hybrid power units. These motors have a better efficiency than induction motors but need to have magnets embedded in the rotor. The magnets are extremely powerful and are commonly made from neodymium which is known as a rare-earth material. This term is somewhat misleading since the various types of material used for rare-earth magnets are relatively abundant in the earth's crust – but are mixed with other elements such as copper and zinc, which makes them challenging to mine and even more difficult to refine, meaning there are few sources of supply. By far the largest source is China which produces nearly four times as much as the USA which is the next largest producer.

The magnets need to be embedded near the surface of the rotor and this too produces a challenge since the rotor spins at a very high speed, 125,000rpm in the case of the MGU-H, such that the centrifugal forces are constantly trying to throw the magnets off. They are generally retained by a carbon fibre sleeve which encases the rotor.

The permanent magnet synchronous ▶

PICTURES: RENAULT; ILLUSTRATION: BENJAMIN WACHENJE

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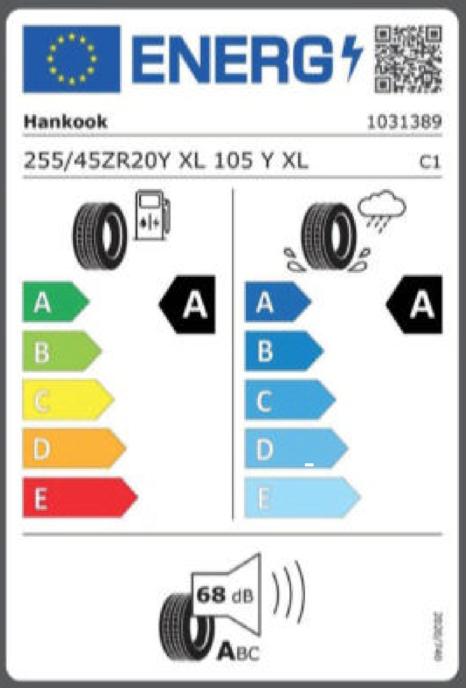

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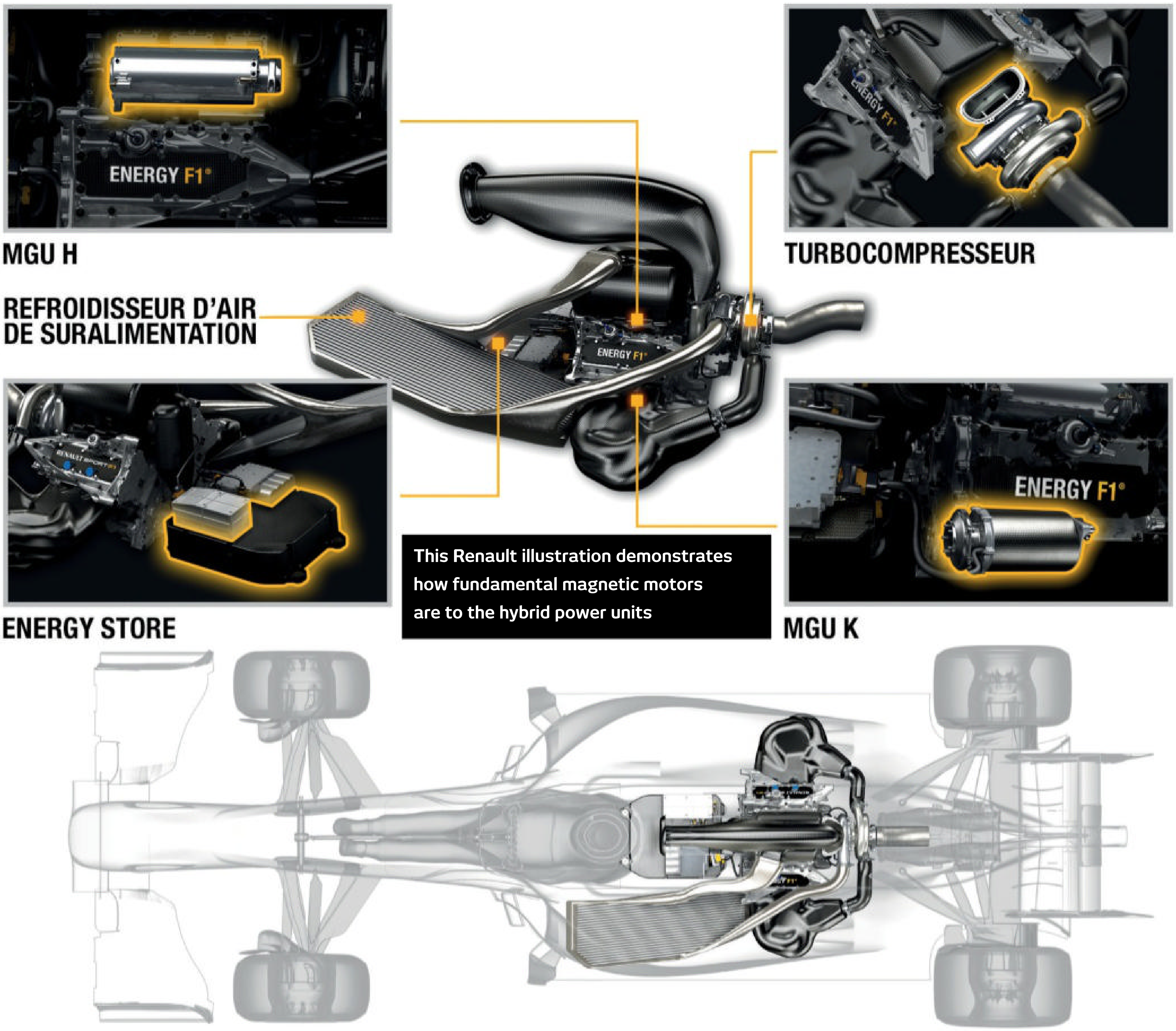
1) TÜV SÜD Tire Test 2022, Report No. 713252186-BM01, -PM01. Test period March 2022. Test performed on the Hankook Ventus iON S with four competitor tyres, in in the size 245/45 ZR19 102Y XL. Test vehicles: Tesla Model S 85, Tesla Model S P100D, Audi Q5 Sportback 40 TDI, VW Tiguan 2.0 TDI. Test location: IDIADA, Papenburg, Neubiberg, Garching. Applies to all further mentions of the TÜV SÜD Tire Test.



This Renault illustration demonstrates how fundamental magnetic motors are to the hybrid power units

motors also require a more complex control and need to have the rotor cooled in order to keep the magnets at a temperature where they maintain their magnetic properties. However, the fact is that in this type of motor there is much less energy loss than in an induction motor. This may amount to a 2% difference in efficiency but is enough to make the PMSM almost universal in vehicles.

THE GENERIC DESCRIPTION OF AN ELECTRIC MOTOR COVERS A MULTITUDE OF DIFFERENT DESIGNS AND FUNDAMENTAL PRINCIPLES

The control of the motor is essentially the control of the current in the coils of the stator to produce a rotating magnetic field. This interacts with the magnetic field of the permanent magnets on the rotor to produce a torque. This is done by the inverter which, in an F1 hybrid system, is a silicon carbide switching device which is faster and more efficient than the older pure silicon devices.

The inverter changes the direct current the battery stores to the alternating current that the motor requires. In the context of a vehicle it also needs to act as a speed controller for the motor and does this by altering the frequency of the alternating current output. This changes the rotational speed of the magnetic field in the stator and hence its interaction speed with the magnets on the rotor. The rotor therefore spins at the speed or frequency of the current in the stator which is why this type of motor is called synchronous. The inverter can also change the amplitude of the alternating current, thereby controlling the torque of the motor.

Motors can also be radial flux or axial flux. Radial-flux motors are more compact in diameter, but axial-flux motors which are pancake shaped are gaining popularity in many vehicles, since they're ideal for either hub mounting or mounting between the engine and gearbox.

So, just as is the case with batteries, we've seen that the generic description of an electric motor covers a multitude of different designs and fundamental principles, each with their advantages and disadvantages. Ultimately, as with all things in Formula 1, the most efficient wins through.

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We spoke to George, one of Gullivers' dedicated Tour Managers, to discover his experience of the recent Monaco tour:

WHO ARE YOU AND WHAT WAS YOUR ROLE IN MONACO?
Hi, I'm George and my role was to look after clients travelling with Gullivers Sports Travel. I was a friendly face guiding clients to where they needed to be throughout the weekend. On the first night, I attended a welcome drinks event in one of our hotels which was a great opportunity to socialise with clients and hear their stories.

WHAT WAS YOUR FAVOURITE PART ABOUT THE RACE DAY?
Aside from the race itself, my favourite part about the race day was the atmosphere and the buzz which surrounded Monte Carlo. Before the Grand Prix, I walked to a viewpoint by the Prince of Monaco's Palace which provided the most amazing view of the circuit and the yacht-filled harbour, which was enhanced by the sound of car engines echoing throughout.

WHAT WAS YOUR HIGHLIGHT OF THE WHOLE TRIP?
My highlight of the trip has to be the fan zone on Saturday when some drivers were brought on stage prior to qualifying. I never expected to be so close to the likes of Max Verstappen and Lewis Hamilton!

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STRAIGHT TALK

MARK GALLAGHER

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YOU CAN STILL EXPECT THE UNEXPECTED

This issue of *GP Racing* was printed the day following the 40th anniversary of my joining its sister publication *Autosport*.

Starting work in the advertising department meant cajoling hard-pressed punters into taking a classified or display ad, but the graft didn't matter. This was *Autosport* and that meant opening doors to all kinds of possibilities.

One such was my first weekend working at a Formula 1 race, the 1983 Dutch Grand Prix. My job was to deliver posters for a sponsor, Valvoline as I recall, even if it did involve walking for what seemed like miles across sand dunes. I was a very happy 21-year old.

I reflected on this recently when witnessing grumpy fans celebrate the fact that the cancelled Emilia-Romagna GP meant one less weekend of having to watch Red Bull win again.

There has been much hand-wringing over the manner in which Team Milton Keynes has steamrollered F1 recently but, and I hate to tell you, it's been my career-experience that our sport tends towards this. One or two British-based teams have usually dominated F1 while Ferrari oscillates between glory and disappointment, apart from those years when Michael Schumacher and Ross Brawn ignored the script.

Zandvoort 1983 and a first weekend working at a GP: Arnoux's final F1 win (top) and Watson passing Marc Surer in the Valvoline-backed Arrows (above)

Back in Zandvoort I arrived to watch Nelson Piquet qualify his Brabham on pole, then suffer a collision with Alain Prost's Renault during the race, allowing René Arnoux to take his final ever win for Ferrari followed home by team-mate Patrick Tambay.

For this Belfast boy there was a podium to celebrate, however. Northern Ireland's John Watson third in his Ford Cosworth-powered McLaren on a weekend when team-mate Niki Lauda introduced the team's new TAG-Porsche power unit. That made up for witnessing a DNQ for another home-grown hero, Kenny Acheson in the unloved RAM, seven and a half seconds off pole.

While Piquet would claim the drivers' title and Ferrari its second successive constructors' crown, from that year on I watched and worked in F1 as success see-sawed between McLaren and Williams through the 1980s and into the 1990s. Benetton joined Ferrari in what we called the 'Big Four', but in reality it was the Big Two-Plus-Two because the Italian-owned teams found it hard to wrestle the crown away from Surrey and Oxfordshire on a consistent basis.

After Schumi's five-year dominance at Ferrari and Fernando Alonso's back-to-back run at Renault we had a unique trilogy: Kimi Räikkönen taking Maranello's most recent drivers' title, Lewis Hamilton his first at McLaren, and Jenson Button that remarkable success for Brawn in 2009.

Since then it's been Red Bull and Mercedes all the way and, frankly, it's hard to see who is going to change that during the current regulatory era. The fail-safe has often been the rivalry between team-mates, Max and Checo being the latest.

But here's the thing. The dominance enjoyed by the big teams means we enjoy one-off victories of others more when they happen. Those wins which shine and sparkle down the mineshaft of F1 history.

Olivier Panis's win for Ligier in Monaco, Jordan's title challenge in 1999 or the singular successes of Robert Kubica at BMW and Jenson Button at Honda. We cherish those, just as we will if Fernando nicks a win for Aston Martin on a weekend when the Red Bulls trip up.

You'll remember that long after it happens. Maybe even 40 years from now.

PICTURE: MOTORSPORT IMAGES ARCHIVE. ILLUSTRATION: BENJAMIN WACHENJE

THIS MONTH

Pol Sancho

Founder, GPBox

From designing and building Moto3 competition bikes to becoming a stress engineer in Formula 1, Pol Sancho was enjoying a relatively typical motorsport career trajectory. But he wanted to make it in business as well, which is why he founded the online marketplace GPBox – and coded it himself…

CV

2019-	Project manager, deputy general manager, QEV Technologies
2019-2021	Executive MBA, IESE Business School
2018-19	Stress engineer, senior stress engineer, Renault F1
2017-present	Founder, GPBox
2017	Stress engineer, Force India F1
2015-17	Stress engineer, Manor Racing
2014-2015	MSc in motorsport engineering, Oxford Brookes University
2013-15	Co-founder, BASS Racing
2013-14	Project engineer, Solid Engineering
2007-12	MEng in mechanical design and MEng in industrial engineering, Universitat Politecnica de Catalunya
2006-08	Founder, Xtremecooling

INTERVIEW STUART CODLING

GP Racing: You had a very interesting entry point into motor racing – going straight into designing a motorbike…

Pol Sancho: I graduated in Barcelona in mechanical design, engineering and automotive engineering. Different universities compete with projects such as Formula Student and MotoStudent, which we won in 2012.

We were young and naïve and thought we were the best, so we founded BASS Racing to design and build motorbikes from scratch for the up-and-coming riders in the Spanish championship. So that triggered my passion for motorsport and for having my own business – to follow the former I moved to Oxford where I did a Masters' degree and went into Formula 1 with Manor, then Force India and Renault.

GPR: What was it like getting your start with Manor, one of the teams which was struggling?

PS: I was in the room that sixth of January [2017] when we were told the team was no longer competing. It was unfortunate Manor didn't survive because it was amazing experience – we were roughly 250 employees, 35-40 engineers, much smaller than other teams but we still had to make a car. And it's got 26,000 parts. So it's very, very challenging but you gain a lot of experience getting to know the car as a whole rather than on a big team, where you end up focusing on individual areas. That certainly helped me a lot as I moved along the rungs and at Renault I was the team leader at the front of the car, overseeing everything from the mirrors forwards. I believe I was the youngest senior stress engineer in that team and that was thanks to my Manor experience..

GPR: You did an MBA as well. Was this something you did in parallel or did you decide there was a right time to go into business for yourself?

PS: It's most engineers' dream to work in F1 and to spend your life in it. For me it wasn't enough to do this for the rest of my career. I always had in the back of my mind that spark of making my own thing from scratch. So I decided to move back to Barcelona and do an MBA here in the IESE Business School, which is one of the top three in Europe. If people think Formula 1 is hard they should try an MBA – it's nuts! But it went really well.

The idea for GPBox came before I joined Renault. I'm an F1 fan and I like to collect memorabilia. When Manor closed I bought most of the parts I designed – front suspension, sub-assemblies, internal stuff. And that triggered an idea. There's a lot of stuff which can be put in front of fans which they can't see or access. Thousands of individual products out there, amazing sellers doing everything from posters to mini figurines – why not create a platform to connect these two audiences?

GPR: And you did the coding yourself?

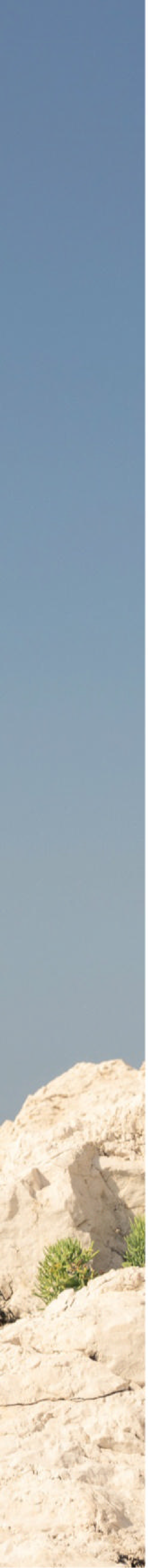
PS: The transition to software has been at the forefront of everything over the past 15 years so I was feeling a little bit behind. So I thought, "I need to learn how to code." And both things developed alongside each other so I coded the marketplace. And the platform was getting better as I was getting better at coding.

GPR: Do you find people come to you because they're disenchanted with the likes of eBay and Amazon?

PS: There are currently a lot of platforms that focus on product type and they have a plethora of categories where as a motorsport fan you struggle to find the right thing. So we've flipped the model upside down and focus on one category – the motorsport fan – and offer every type of product for them, from a little painting by a guy in his shed to more valuable products. We offer print-on-demand, different product templates for e-racing liveries and helmet designs, all kinds of stuff. You can create a shop in under 30 seconds and with seven clicks. We're not trying to compete with official merchandise stores – if you want a Ferrari you'll go to the Ferrari store – we're connecting sellers with fans and making it easy to find some really cool products.

PORTRAIT: GPBOX

QUADRANT



KING OF THE WORLD

While wins and podiums on track are a little out of reach for now, Lando Norris keeps his sights set high – and, in parallel with his racing career, he's been working on world domination through his trend-setting merch, media and gaming company…

WORDS STUART CODLING PORTRAITS ANDREW FERRARO

9AM ON A LATE SPRING DAY in Monaco and already the sun is intense enough to have *GP Racing* scuttling for shade in the forecourt of the Columbus Hotel. On the opposite side of the road, in full stealth mode – backwards-turned baseball cap, dark shades and an on-brand Quadrant hoodie – Lando Norris is chatting to a lycra-clad Mark Webber, off to crest one of the local cols on his bicycle before lunch. Webber waves a cheery farewell, clips in and pedals *souplesse* into the sunshine.

As Lando joins us we notice an additional element of disguise: the wispy beginnings of a beard protruding from his chin, soon to be premiered to viewers of his YouTube channel as he essays an exclusive preview of the new F1 2023 game. Monaco, where Lando has resided since early 2022, is famously protective of the privacy of its residents; we can't help but wonder if there's been an element of culture shock having moved from leafy Surrey, where people say hello to one another while out walking the dogs. Is Monaco and the riviera – famously described by Somerset Maugham, who kept a mansion on nearby St Jean Cap Ferrat, as "a sunny place for shady people" – more like London, where residents act as if nobody else exists?

"Kind of," laughs Lando. "There are more people with chihuahuas in handbags and that sort of stuff… It's a nice place. It's quiet at times and I think a lot of people mind their own business – which is also, I guess, another reason why I like it. But you get to know a few people and you always bump into them because it's such a small place."

As if to emphasis this point our *West Wing*-style walk-and-talk westward, past the Roseraie Princess Grace and the Jardin aux Canards and skirting the helipad which whisks plutocrats twixt the Principality and Nice airport, is briefly interrupted by a young couple strolling in the opposite direction who bid Lando a delighted good morning. Ready to be impressed at this illustration of Monaco's goldfish-bowl nature, *GP Racing* enquires whether he actually knows them.

What better location for *GP Racing* to quiz Lando on why he is so keen on his Quadrant business enterprise?

"No! And this is one of my more discreet outfits. Maybe they recognise me by my lips…"

Moving to an enclave where you can drive from one border to the opposite side in minutes (albeit not in rush hour) almost inevitably means forming connections with people in a similar trade. As we cross said border into France, hugging the coastline past the marina at Cap d'Ail and on to the promenade, some recognisable faces come trotting past on their morning runs.

"If I go out," says Lando, "I'm more likely to go for a cycle than a run. The running is lovely but I'm more likely to go for a little cycle up the mountain or something."

He gestures in the direction of the famous *Tête de Chien*, the limestone outcrop above the village of La Turbie which towers over the Monaco skyline. The hairpin-strewn road up to there from Cap d'Ail was the scene of many an epic finale to the annual Paris-Nice road race, including Raymond Poulidor's defeat of Eddy Merckx in 1972. Not that Lando hangs out with the many pro cyclists resident in Monaco, or even Alex Wurz and his 'chain gang' of current and retired racing drivers; he prefers to hit the road with his neighbour Thierry Vermuelen, a DTM racer and son of Max Verstappen's manager.

> THE OFF-TRACK LIFE OF AN F1 DRIVER DOESN'T NECESSARILY ROTATE AROUND LEISURE AND TRAINING, THOUGH. MANY HAVE EXPANDED THEIR INTERESTS INTO THE BUSINESS WORLD

"It's nice to go out training with someone. We're together a lot. I went to a GT race Thierry did at Brands Hatch, which was a fun thing – I haven't been to Brands in years, and it was good to go and watch a race that wasn't F1, which is something else I haven't done in a while."

The off-track life of an F1 driver doesn't necessarily rotate around leisure and training, though. Many have expanded their interests into the business world, driven by a competitive itch as well as the need to retain a purpose come retirement: David Coulthard was an early investor in the Columbus Hotel and co-founded the award-winning Whisper Films, producer of Channel 4's F1 coverage; Valtteri Bottas has launched his own make of artisan gin; and Jenson Button has a whisky brand as well as an ongoing collaboration with Hackett. Typically it's something drivers begin to contemplate as they realise more of their racing careers lie in the rear-view mirror – but not in Lando's case.

During the early Covid lockdowns the majority of people occupied themselves with online gaming or binge-watching *Tiger King* and such. There were notable outliers such as

In one of his brand's own hoodies, Norris went into in full stealth mode...

LANDO'S NEW WHEELS

McLaren has a rich tradition of offering bespoke finishing touches on its road cars. In 1969 Bruce McLaren built his own – based on a racing chassis – and, when the company set out to create was then the ultimate road-going performance car in the 1990s, the aptly named F1, customers with deep enough pockets to buy one could call *most* of the shots. Infamously, one customer asked for theirs in the deep purple lustre of an aubergine; McLaren staff went on a shopping spree to offer him a selection, then colour-matched the finished car to his chosen aubergine… only for him to decide against buying the car. Still, it found an owner and is now in Hong Kong.

The modern incarnation of McLaren Automotive, launched by former group CEO Ron Dennis in 2009, is based alongside the McLaren Technology Centre in Woking, in a factory built half underground and screened from passing traffic (to comply with planning regs rather than Ron's need for secrecy). A sub-division called McLaren Special Operations offers the bespoke tailoring service and Lando took full advantage when he ordered his limited-edition 765LT Spider. It is, to use millennial parlance, "fully loaded" and even includes his personal logo embroidered into the headrests.

"It's beautiful," he says. "I'm very, very happy. I guess it's probably my most expensive purchase. One way of rewarding myself or giving something back to myself, I suppose, and it's come out really nice…"

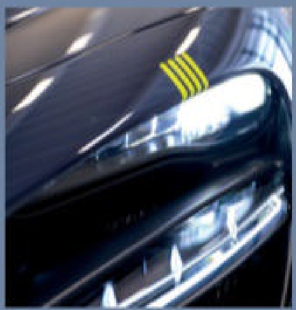
Giving something back to McLaren as well, *GP Racing* cheekily suggests.

"Ha! In a way – it's good for them at the same time. I think it looks amazing, especially in the sunshine like we've got today. It's all blue carbonfibre, the whole thing. I'm a carbonfibre addict. I just love the look of it. I specced as much of it as I could, every little detail is customised to what I would like, both inside and outside. It's gonna be insane.

"MSO will literally go as far as you want with the car. I doubt there's many customised cars you can get which are as good as this. So many other car companies are very limited with what you're allowed to do, but with MSO you can do anything. It's pretty epic the level of detail, they look into every single part of the car, change colour, change shape. There's so many options. Obviously I'm biased but I'd would say MSO was the best for customising and getting your personality into a car."

Should you wish to build your own Lando-alike 765LT Spider – well, you're too late, because all 765 of the twin-turbo 765bhp V8-powered speed machines have been sold. But you could order a regular production car and select a few of the following from the MSO options: Gloss Blue Tint Carbonfibre exterior with contrasting Satin Visual Carbonfibre details; Satin Black wheels with Lando Yellow brake callipers; Carbonfibre Exterior Upgrade Packs (there are three, covering front and rear diffusers, air intakes, door mirrors, side skirts, rear wing and roof); and don't forget the titanium exhaust, MSO custom steering wheel, custom instrument graphics and carbonfibre Union-flag door sills.

McLaren
765LT SPIDER
Exclusively Commissioned for Lando Norris by MSO
MSO



Vladimir Putin who, perhaps in the absence of a Netflix subscription, took the route of sitting in a darkened room scheming world domination. Lando Norris took his first steps to becoming a business magnate, announcing the launch of his Quadrant company during a Twitch livestream in late 2020.

"It was something I'd wanted to do before [2020], even," says Lando. "We spoke about it often through 2017, '18, '19 but there just wasn't enough time to commit to doing it because there was so much focus on getting Formula 1 right. We were going to let things kind of settle down, three or four years, for me to get a little bit more into the life of F1. So we thought about it like this. But then when Covid came up there was the opportunity to do it – everyone was at home, everyone was playing games and connecting with each other online. That was how so many people were dealing with the big change in their lives. It seemed like a good time to start something.

"So we started talking to some people and seeing how we could put it all together. And then we came across the Veloce Group, and things kind of started rolling from there."

Veloce was co-founded in 2018 by former Toro Rosso F1 driver Jean-Eric Vergne, retired racers Rupert Svendsen-Cook and Jack Clarke, and former football agent Jamie MacLaurin. From an entry point as a professional esports organisation it's become a multi-media powerhouse with a reach into 'real' as well as virtual racing, operating a race-winning Extreme E team and backing multiple champion Jamie Chadwick in the now-defunct W Series. Official F1 Esports series champion Jarno Opmeer is also on the books.

> "IT WAS A NEW THING FOR ME TO START UP THIS KIND OF THING AND BE INTRODUCED TO THE MECHANICS OF RUNNING A BUSINESS. BUT IT WAS SOMETHING I LOVED SO MUCH"

It was Veloce which took the initiative of kickstarting the "Not The Grand Prix" virtual racing series within 48 hours of the Australian GP's cancellation in March 2020, tapping up Lando as well as influential esports racers such as Jimmy Broadbent alongside other sporting stars. The relationship developed as Lando became a regular fixture in the series and the company seemed a natural fit to facilitate Lando's vision of what Quadrant should be – and to do the heavy lifting for an individual still focused on a growing F1 career.

"It sort of took a while to get things started after first thinking of the idea a few years before," says Lando. "But in terms of starting a business and company and things like that, things actually started to go pretty quickly. Especially for me, it was a new thing for me to start up this kind of thing and be introduced to the mechanics of running a business. But it was something I loved so much – I wanted to do it, I was passionate

about it. Once it started it began to roll quite quickly.

"Choosing the right people was one of the hardest things to do. But I'm confident to say I think we found the best people in such a short time to put it all together and do an extremely good job. They're passionate about what they do and have a lot of knowledge in many different areas – for instance Jamie was a massive gamer when he was younger – still is, actually, we still hop online every now and then and play some games."

The Quadrant name is a play on Lando's race number and what he describes as the "four pillars of the business – racing, gaming, clothing and content". His aim in giving the enterprise a name of its own is to enable it to exist separately from his own personal brand, building towards a more universal appeal outside motor racing. Hence the merchandise, for instance, leans in to street fashion rather than the logo-bedecked artificial fabrics of most official racing merch.

"The merchandise is one of the biggest areas of it. It's one of the things that people love the most in a way. People wear clothes every day, after all…

"The *right* kind of merch, that's the tough part of it. I'm happy to say we've sold out everything we've done so far. I guess I have a good fan base.

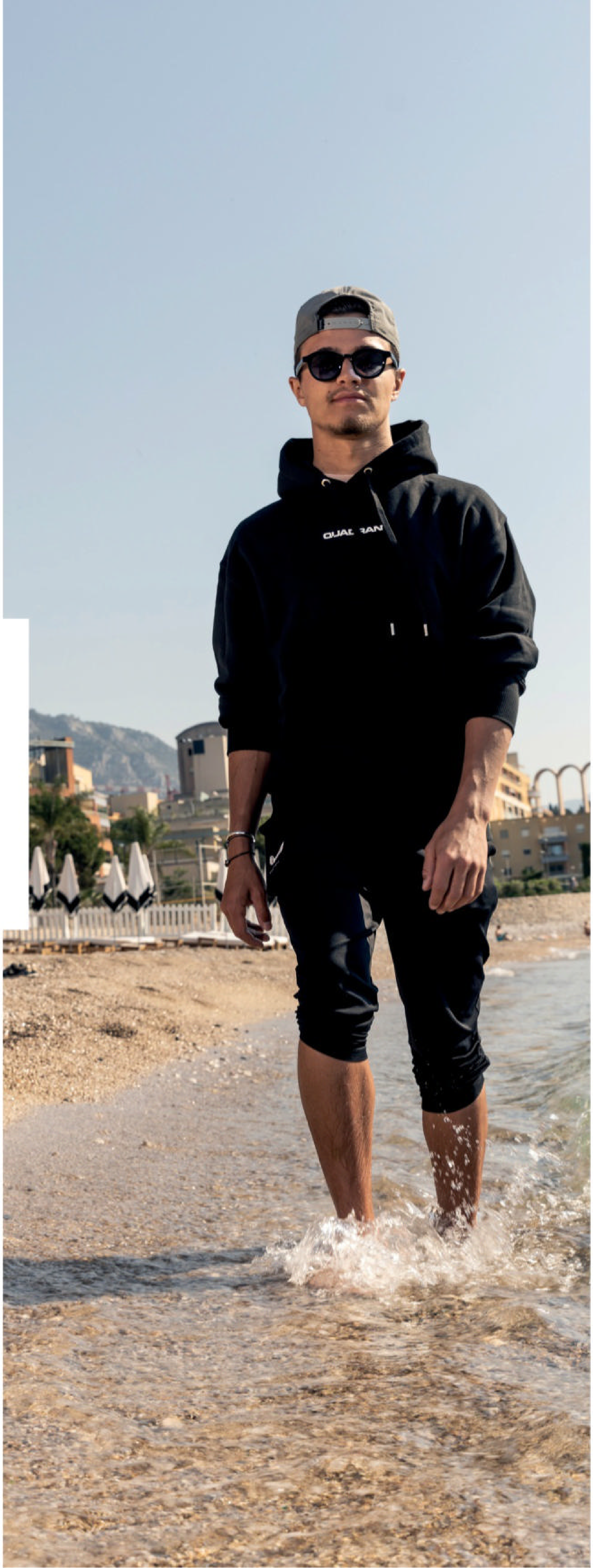
"When you're designing and creating merchandise, you want something people are happy to wear. And you have the fans who are racing based, who might have been my fans for years, others who are maybe fans of Quadrant, the gaming things. But at the same time you want to expand even on top of that – you want to appeal to people who have no idea about racing or games. That's when it gets more complicated. So you have to come up with better ideas and cooler things, hiring more people to look into where it's best to target – marketing people as well as designers. Too complicated for me! But it's a cool thing to be part of, just coming up with different ideas and ways of introducing Quadrant to the normal home life and lifestyle of people."

> "THE MERCHANDISE IS ONE OF THE BIGGEST AREAS OF IT. IT'S ONE OF THE THINGS THAT PEOPLE LOVE THE MOST IN A WAY. PEOPLE WEAR CLOTHES EVERY DAY, AFTER ALL..."

The aim is for Lando to be, if not hands-off, certainly a little less front-of-house – for the Quadrant brand to take on a life of its own. Post-pandemic he's had less time on his hands, although the Veloce team still refers to him as "the CEO".

"Of course, during Covid it was easy to be involved in every video and do all of this, which was perfect for the launch," says Lando. "But at the same time Quadrant, hopefully, isn't something that's reliant upon me to be in all of it. I want it to be almost a separate place where I'm involved but, at the same time, it can run happily and still be very successful even if I'm not in everything. That's the plan for it – right now I could put a lot more time in there but all my focus is on Formula 1. When I have the free time I help as much as I can."

By all accounts this takes the form of fusillades of WhatsApp



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10/11 Feb 2024	**Jerez /E – Race days**
15/16 Feb 2024	Valencia /E – Test days
17/18 Feb 2024	**Valencia /E – Race days**
29/1 Mar 2024	Aragón /E – Test days
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RACE TEST DAYS

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18 Jul 2023	Nürburgring Sprint /D
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9 Okt 2023	Hockenheimring /D
16/17 Jan 2024	Portimão /P
18/19 Jan 2024	Portimão /P
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messages crammed with ideas for everything from new merchandise to videos on Quadrant's YouTube channel. From the off, the content element has been a partnership with online gaming personalities and creators with suitably eccentric gamertags: Steve 'SuperGT' Alvarez, Maria 'RishBish' Bish, Arav 'Aarava' Amin and Niran 'FNG' Yesufu, latterly joined by Call of Duty streamer Ethan 'Fifakill' Pink and Lando's old racing rival Max Fewtrell. Lando appears in solo videos as well as alongside his fellow creators and the tone is entertaining and irreverent, sometimes even anarchic – a vast departure from the kind of stuffy corporate gigs drivers still have to participate in. "I don't have a Scooby Doo where I'm going," he giggles while exploring the new Las Vegas track for the first time during his F1 2023 game preview video; not words you would expect to be welcomed in the McLaren simulator.

While esports remains a curiously polarising field – you either get it and are utterly embedded in the world or have no interest whatsoever – it's an increasingly big business and not just in terms of prize money. Quadrant's esports arm has a raft of official partners for its teams in the Rocket League and Halo championships, supplying branded gear: SCUF controllers, JBL Quantum headsets and Elgato streaming equipment.

In the coming months Lando's company is going to expand even further, with an athletes programme a little bit like that which Red Bull has operated successfully for many years now, broadening brand identity by supporting competitors in extreme sports.

> "IT'S STILL EARLY DAYS BUT WE'RE PUSHING ON WITH IT AS MUCH AS WE CAN, AIMING TO CHOOSE THE RIGHT PEOPLE TO REPRESENT US. NOT PEOPLE WHO JUST SAY 'YES' TO STUFF BUT PEOPLE WHO ARE PASSIONATE AND WANT TO BE PART OF SOMETHING NEW AND EXCITING"

"The target is to move outside car racing," says Lando. "It's still early days but we're pushing on with it as much as we can, aiming to choose the right people to represent us. Not people who just say 'yes' to stuff but people who are passionate and want to be part of something new and exciting.

"It's going to be cool stuff – more extreme sports. A programme like this, it's the next step we want to take because I don't want Quadrant to be just about gaming, I want it to be representative and be part of many people's stories. So the athlete programme will be our next big thing, trying to find different people, probably a younger demographic, to represent Quadrant through the journey they're doing. My interests are kind of on the X-Games side of it – snowboarding, skateboarding, motocross, rallycross – anything that's spectacular and engaging and a bit crazy.

"Well, quite a lot crazy..."

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WORDS MATT KEW
PORTRAIT SAM BLOXHAM/MOTORSPORT IMAGES

LEWIS HAMILTON

Working all the hours to get the best out of Mercedes' troublesome W14 while policing the authenticity of the Brad Pitt-starring Formula 1 Hollywood blockbuster currently in production? No problem for a seven-time world champion who's a multi-tasking king...

After such sustained success, how have you adapted to knowing that you turn up to races with only an outside chance of winning?
I never got comfortable. But, damn, it's a great feeling when you know you've got a car you can compete with on the weekend. From our perspective, we know we're not fighting for a win. So, it's arriving hopeful that we're able to find a little bit of magic. Every small decision, every position that you gain in qualifying makes that difference. I would say I'm enjoying this more... for the short term.

How has the team come together and how much have you all learned from this tough period?
As the sport continues to grow, there's more people coming into the team. There's a lot of people on the team that had all the success that we've had in the past. There's a lot of people that haven't had that success yet and are super hungry. I'm really encouraged when I go back to the factory and see just how hard everyone's working. Last year, we were a little bit lost in terms of how to fix the issue we had. I feel like the team now have a north star. They know exactly where they need to go and we're working on how to get there. The amount of work that has gone in is incredible. I'm very grateful.

What's it been like to be involved with the production of the upcoming Formula 1 Hollywood blockbuster?
I'm focused right now on making sure the script is where it needs to be. So, that's where all the time currently is – going through the script, making sure we've got a really great and diverse cast. But director Joe Kosinski's focus is to make sure we're as embedded into this sport as possible. For me, it's to make sure that it's authentic and that all of you racing fans see its authenticity and say this is believable. Secondly, I have a view of racing from a different perspective than you might see on TV. It's an amazing process. I'm really enjoying it.

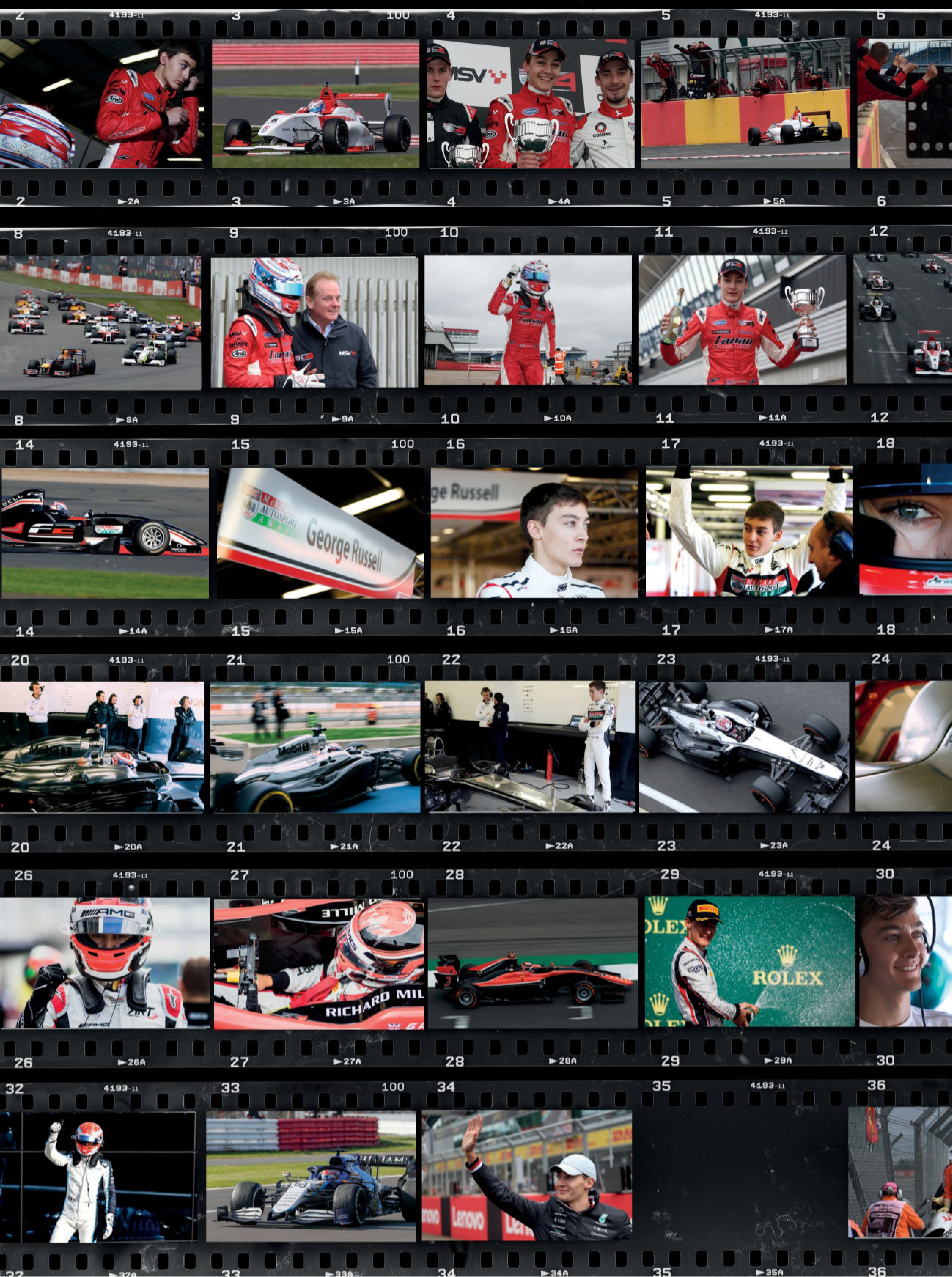
And what's your vision for the biographical Apple documentary, where a camera crew will have full access to your on- and off-track life?
It feels strange having a camera following you around. It's about my life, my career and the journey to where I am. I have the hope really of doing what Ayrton Senna's documentary [*Racing Is in My Blood*, 1992] did for me as a kid. Something new and fresh. Hopefully, this will be able to do that for the young kids watching, coming home from school and dreaming of something. Hopefully, they'll able to watch this and be inspired to do something great themselves.

Do you like the direction F1 is taking as it chases a bigger audience and more races?
I've been here a long time. I like the change we're seeing and it's exciting coming to different parts of the world and different circuits. I'm hoping we get to go to Africa soon and that will be an amazing experience for the whole circus to experience the culture there. It's a challenge from an engineer's and driver's perspective going to these new places. Of course, I'll always prefer the older circuits. All the old classics like Hungary, Silverstone, Zandvoort and Monza, they will always be special. It's important we continue to have those in the DNA of F1. As far as I'm aware, [F1 CEO] Stefano Domenicali isn't planning to get rid of ones like that. It's good to have a balance.

> SILVERSTONE IS ONE ALL THE DRIVERS LOOK FORWARD TO BECAUSE WE HAVE GREAT RACES THERE

Looking ahead to the British Grand Prix: how has Silverstone changed in the years you've been racing there? What do you make of the place?
From the first time I went there, probably when I was 13, in the old paddock, it's definitely evolved massively. I think it's come a long way. While a classic circuit still, there's more futuristic facilities. It's right up there with all the best circuits, but it has the best layout. It's just such a great racetrack for us all. Silverstone is one all the drivers look forward to because we have great races there. There's actual real overtaking and you have crazy high-speed corners. It's one of the best.

F1 has even roped in Silverstone's bosses to help get the inaugural Las Vegas GP up and running. What makes the British GP the right template for new venues?
I think Silverstone puts on a great race. But it's a much different race to what you'll see at Vegas. They put on an amazing show in the UK. The organisation is great there. We have a big, huge turnout of fans.



MSV
George Russell
McLaren Autosport BRDC Award
ROLEX
RICHARD MILLE
Lenovo

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RUSSELL
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HOW SILVERSTONE MADE GEORGE RUSSELL

From firing George's passion to become a racing driver in the first place, through a tense evaluation for the McLaren *Autosport* BRDC Award to racing in Formula 1, the home of the British Grand Prix has been a pivotal location in the career of the young Mercedes ace

WORDS OLEG KARPOV
PICTURES motorsport IMAGES AND JAKOB EBREY

2009

British Grand Prix

"This was my very first grand prix, the very first time I went to Silverstone. I was standing on the edge of the circuit, Turn 1, Copse – the current Turn 9. I would have been 11 years old, racing in the cadet category in karts, it was called Comer Cadet then, and I was leading the championship. But it was there, standing on the outside of Copse, when I probably for the first time clearly realised I wanted to be a Formula 1 driver. I think the years prior I was too young to really know F1 and what exactly that was, I was just enjoying go-karting. But hearing the noise, the buzz, seeing the crowd... That's when I was like, 'Yeah, this is what I want to do.'"

63
Santander
►1

2014

BRDC Formula 4 Championship, Round 1

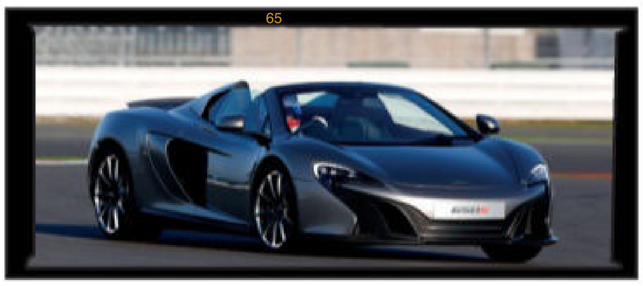
"My very first-ever race in single-seaters, and my very first race at Silverstone.

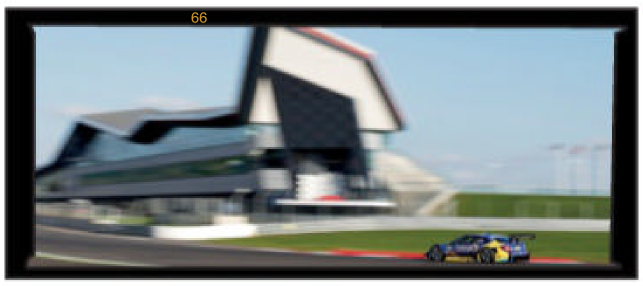
"I remember a very special feeling. Just racing at Silverstone in a car like this... Silverstone just felt so big and wide. And it was almost surreal to be on a Formula 1 circuit in such a small Formula 4 car. I can't remember the exact lap times, but probably around two minutes and five seconds, really slow. But that was the start of a new chapter in my career.

"This was the opening round of the championship and there were three races that weekend, and I believe I won two of them."

2014

McLaren *Autosport* BRDC Award evaluation





"End of 2014, the McLaren *Autosport* BRDC Award [now the Aston Martin *Autosport* BRDC Award]. We, the British drivers, are very fortunate that the BRDC chose six drivers per season – aged, at the time, from 17 to, let's say, 23-24, so young up-and-coming drivers – and they would give them a chance to do a shootout in a Formula 2 car, Mercedes DTM car and a McLaren GT car. And the driver who came out on top won £100,000 and a test in a McLaren Formula 1 car.

"I remember they actually had to change the rules because I was too young. I was 16, so I was the youngest driver ever to be nominated for this award. And actually, Mercedes, the DTM guys, were having some difficulties because they believed I was too young to be driving this DTM car.

"But yeah, that was an exceptional experience, driving an F2 car which felt so quick at the time, jumping from F4. The DTM car was cool to drive, almost like an F3 car. The GT car, very different – driving around the last corner at Silverstone and the car bounced off the circuit, because there was no downforce. But yeah, that was a great experience.

"I called a few drivers before going to Silverstone to ask for some advice – and I find it unbelievable no one else did. I spoke with Matt Parry, the guy who won it before me, Oliver Rowland and Alexander Sims. And then I spoke with a few other drivers who did the award, but didn't win it, and even a guy from GT – to be as prepared as I could."

2015
Formula 3 European Championship, Round 1

"Moving to Formula 3 in 2015 wasn't the intention, actually. The intention was to go and race in Formula Renault that season. But this was following the year Max [Verstappen] did F3, and obviously there was this big hype around Formula 3. That was quite a field. Charles Leclerc, Alex Albon, Antonio Giovinazzi, Lance Stroll and Felix Rosenqvist...

"An opportunity came up for me to join Carlin. And we had the money from the McLaren *Autosport* BRDC Award we'd won, the £100,000, which was a huge contribution. And also Jost Capito, who was the head of Volkswagen Motorsport at the time, funded a lot of my Carlin season as well, because it was a Volkswagen engine. So with these things aligned, we took that route with Carlin in F3.

"The first weekend was Silverstone. Race two: Charles was on pole, and I was second – from 35 cars – and I won. On the podium picture, out of shot, is Stefano Domenicali [former Ferrari team principal and now F1 CEO]. He handed out the trophy!"

2015
The prize McLaren F1 test

"A year after winning the McLaren *Autosport* BRDC Award I got my first test in an F1 car. And it was the car Jenson [Button] won the 2011 Canadian GP in! I remember, there was such a noise from that thing... Obviously, the fastest car I'd driven before was the F2 car – the one I drove the year before [in the evaluation]. It was like nothing I'd ever experienced. It was only 20 laps, but a hell of an experience.

"Was I nervous before it? No, to be honest, I was just looking forward. I had the track to myself and was just there to enjoy it.

"But I remember it not being too smooth. I did the first run, and I had so much front end. So after my first five laps I told my engineer, 'Can we take some front wing off? Like, it feels really quite sharp.' And the response at the time was, 'No, no, this is correct.' And something like, 'It'll come to you.' So I didn't argue... You know, I'm 17 and it's my first time in an F1 car, I didn't want to seem like a know-it-all. So, I did my final two runs. I said to the engineer at the end, 'I still struggled a bit with the car,' and they realised they'd set the front wing wrong and that I had 16 turns too much of front wing. To put it in perspective: when we pit, we might ask for one or two turns of front wing more or less!

"I couldn't believe that had happened and I was a little bit upset I didn't get to push the car to its limit, because I wasn't super comfortable with the feeling of it, and it felt like something was wrong. And it turned out something *was* wrong.

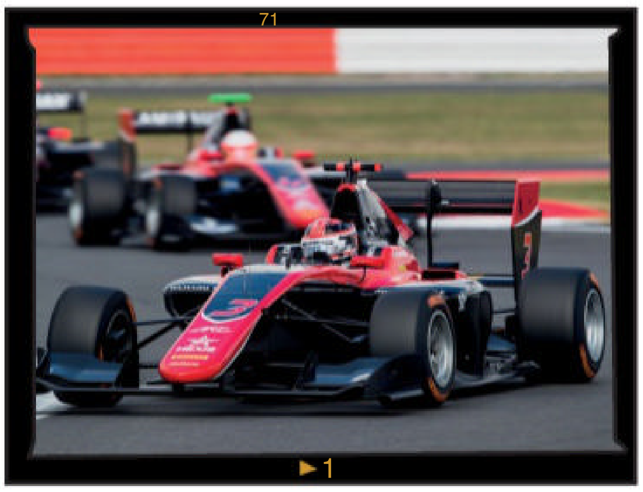
"So you think, 'This is my first time in an F1 car. Will I get another chance?' But I believed I would."

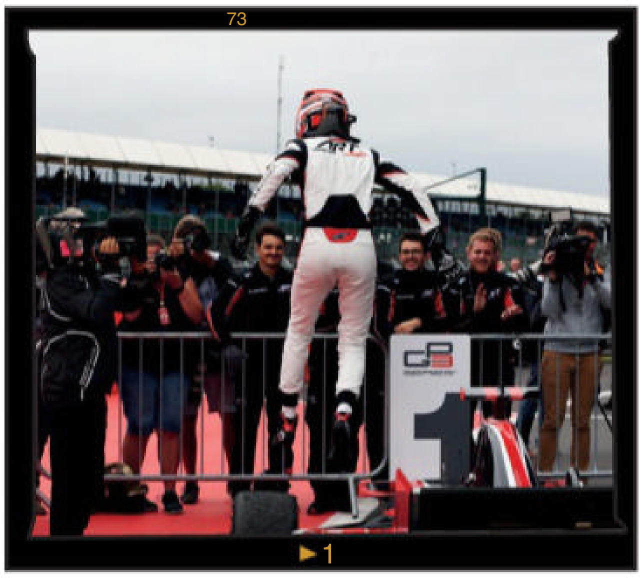
2017
GP3 Championship, Round 2

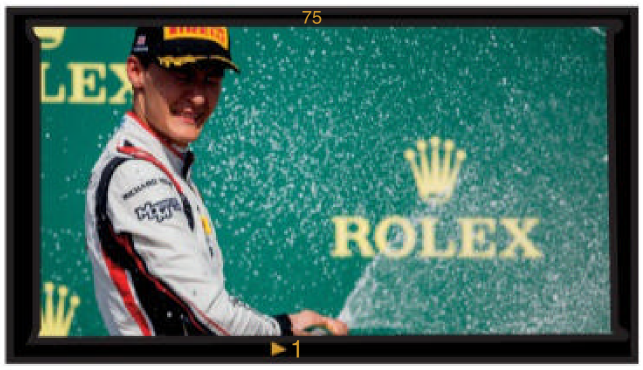
"GP3, my first Silverstone race weekend at the British Grand Prix. To be a support race for F1 definitely changes a lot.

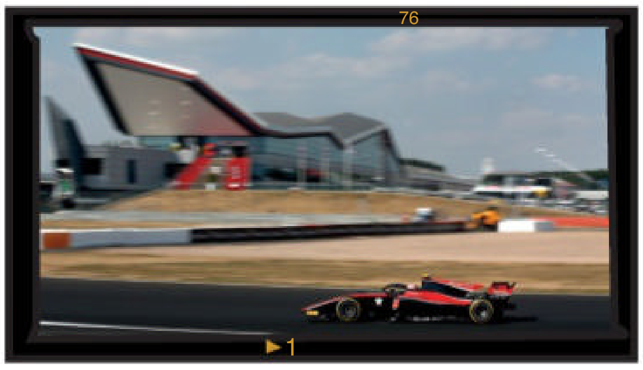
"I'll always remember my first-ever race at a GP weekend, in Barcelona. I vividly remember coming around Turn 7, I got up the hill and it was packed with people – and I'd never seen that many fans before from the cockpit.

"But Silverstone was even bigger. I had some of my friends, my family there. And that was a really intense race. Anthoine Hubert was right on my tail for all of the race. I think he made a better start than me and got in the lead. I overtook him then, but I couldn't leave his DRS. So he stayed within one second of me the whole race, but I managed to get the win in the end." ▶









2018
Formula 2 Championship, Round 7

"I was on pole position this race weekend but finished second twice. I led the feature race, but had a slow pitstop that allowed Alex [Albon] to jump ahead of me… I think we finished 20 seconds ahead of P3. You could see it on my face when it came to the podium for that. I was a bit unhappy, but it's just one of those things…

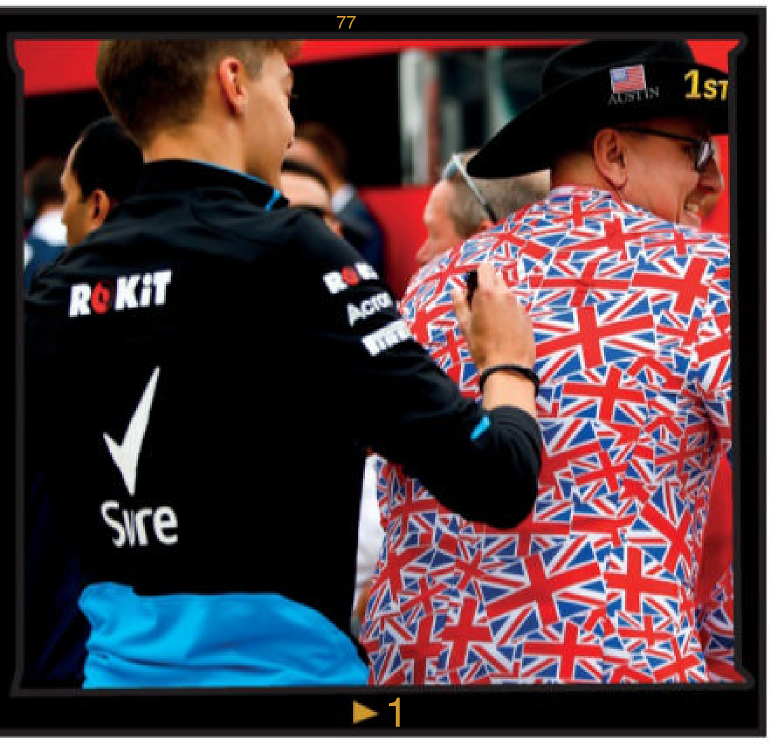
"And then in the sprint race, I started seventh as per the [reverse-grid] rules – and I came back through and finished second again. I think one more lap and we would have won the race. We were catching Maximilian Guenther – with Lando [Norris] just behind me – two seconds a lap, but just ran out of laps.

"I think by that time I believed I'd in F1 next year. I'd already done numerous tests with Mercedes, I tested with Force India a number of times. And at this point, the plan was for me to join Force India for 2019 – and it was only when [Lawrence] Stroll purchased the team it meant that instead of joining Force India I'd be joining Williams."

2019
British Grand Prix

"To be racing at Silverstone for the first time as an F1 driver was really a special experience. I was shocked at how much home support I had, considering I was a rookie. I couldn't believe how many people were there supporting me. Obviously, there were a lot of people for Lewis [Hamilton] but how much support Lando [Norris] and I got as well really meant a lot to me.

"It was a very difficult season. Obviously that Williams year we finished last in almost every race. That car must have been the most uncompetitive car in F1 since maybe 2012 – in terms of the gap from last to second-last. I'll always remember going into the fan zone, standing on the stage where they do the concert, looking out and there were 30,000 people in front of me. I'd never seen so many people just in such a small space. That gave me goosebumps and the motivation that I want to stand on the top step of the podium there one day."



2020
70th Anniversary Grand Prix

"Doing two weekends in Silverstone without fans felt weird. I think very quickly people realised we probably took the fans for granted. The energy they brought to the event, to the race, the support you got. This is part of F1, part of the excitement. And it just felt like, 'Who are we doing this for?' – especially at a place like Silverstone, which thrives off the people there. So that was for sure a very strange time, but there were bigger problems in the world." ▶

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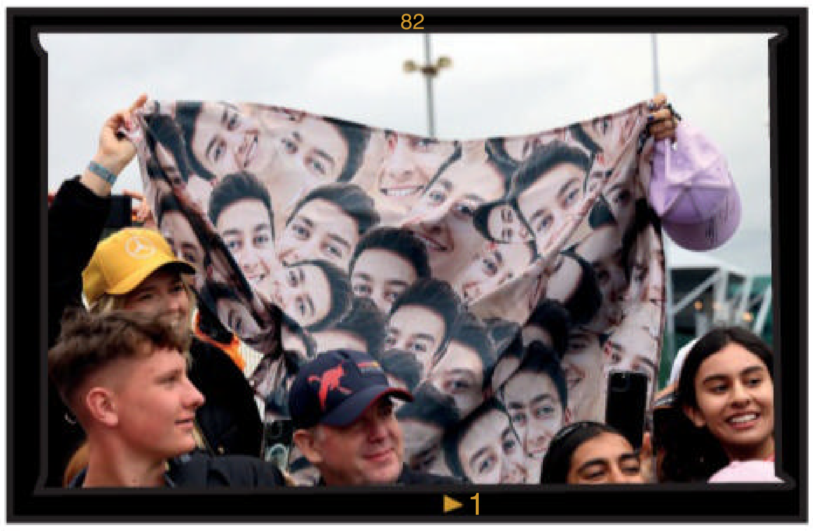
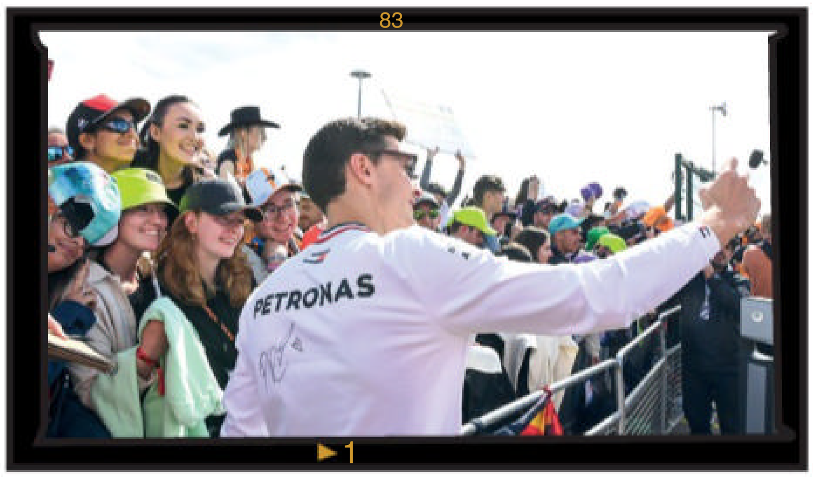
2021 British Grand Prix

"The Williams car back then – and I believe it is still today – was far better on a Saturday than it was on a Sunday. And you were just always moving backwards on a Sunday, which was pretty demoralising. But the qualifying in Silverstone was great. It would have been my second Q3, I believe, which for us at the time was a huge result, and we ended up P8.

"I remember I did my Q3 lap in the middle of the session – and I think I was the only car on track. When I was on my out-lap, coming out of Turn 7, I could see everyone in the grandstand standing up. And it turned out to be a really strong lap and when I crossed the line, I could see everybody cheering. And that was a pretty special feeling."

81
Silverstone
INEOS
Emirates FLY BETTER
▶1





2022 British Grand Prix

"Being a Mercedes driver didn't really change much in terms of attention from the crowd. This is why I really love and appreciate the support in Silverstone – because they were there from day one. It wasn't like there was a big step last year by joining Mercedes, which is what you'd naturally expect. People were there supporting the three of us from the beginning and, yeah, a huge amount of appreciation for that.

"The way the race ended [George went to help Zhou Guanyu out of his car and was eliminated] was a real shame. I could have restarted the car but I actually didn't know how to, which was not cool. And then, yeah, watching it from the garage was probably the most painful hour and a half of my whole year, because it was gut-wrenching, seeing the competitiveness of the car at my home race. To be honest, I wanted to leave straight away. I don't know why I stayed, actually. That was a horrible, horrible feeling. Because also what I love about Silverstone is not only is it an amazing track to drive every single lap – so fast and flowing, and you really need that rhythm – but it's also a really great race circuit. On Sunday there's lots of opportunity to overtake – at Turn 3, Turn 4, Turn 6, Turn 15, Turn 17 – you can overtake everywhere and that's unusual. And then the atmosphere from the fans, the event as a whole. I've always had friends and family who go to Silverstone, and they love the concerts and everything that's surrounding the event. It's just a real excitement."

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WORDS STUART CODLING
PORTRAIT GLENN DUNBAR/MOTORSPORT IMAGES

STUART PRINGLE

Silverstone's managing director explains how the venue has accommodated 9000 more fans this year, and why the action starts on Thursday night…

As a race promoter, what keeps you up at night in the days and weeks before the event?
That's an interesting question, isn't it? Well, all the things that could interfere with the seamless running of the event. The weather – rain can make for a good race but then it adds to the challenge of getting people in and out quickly. There are boring event-organiser things that members of the public aren't really interested in the mechanics of, such as sewage. We have to guard against disruptions such as the Just Stop Oil protest which happened last year. And of course, we have to make sure the IT infrastructure is robust – without it you can't get people through the door, let alone stage a race, so we have contingencies in place for that.

You've been able to increase capacity this year, which must be good for business.
Demand has been very strong. And we've been able to source some additional grandstand seats which has given us extra capacity. And that's great. Of course, there's a knock-on to every decision. You've got to get more lavatories in, for example, and adjust the pinch points on fence lines. That involves landscaping and infrastructure adjustments to make sure we can deliver it. So there's a finely balanced judgement call about offering more people the chance to come when they're keen to come, but making sure you don't reduce the level of enjoyment as a consequence. We're very confident we've made the necessary adjustments to ensure the additional 9000 grandstand seats will be providing an enjoyable experience for the people who occupy them.

Last year you talked about making the weekend a little bit more like a music festival, a four-day event where there's lots going on.
It's very clear what Liberty Media's ownership of Formula 1 is all about. They're on record as saying they want to create the world's biggest sports and entertainment property. And it's down to us promoters to help them achieve that. Some of us are a bit more proactive than others, I suspect. This is not a small investment by us but it's a commitment to that vision for the long term. We're also very conscious that we want to pack the weekend with value – we can't control what happens on track but we can control what happens away from it.

As promoters we buy a package of motor racing, sight unseen, years in advance, and you don't know whether you're going to get a nail-biting multi-car scrap or a runaway victory. So it's important we build in extra value, which is why we've got the likes of Calvin Harris, Jess Glynne, Cat Burns and the Black Eyed Peas performing on stage. Our vision is that we have this ultimate weekend where the British GP is the greatest sporting event of the year.

Silverstone's contract expires after next year's British Grand Prix and Formula 1 is looking to add new venues to the calendar and sometimes old ones are deleted to make way for these. Obviously you can't talk about ongoing contract negotiations but you must be reasonably confident of staying in – and, given that the race used to be marginal on profitability, presumably now you've turned it around you want to keep on hosting it?
I agree with both your statements! We've come on top of F1's own fan satisfaction survey every year they've run it. We're always in the top two or three in terms of attendance, it looks great on TV, it's popular with celebrities and VIPs, and we've got globally recognised music artists coming. That entertainment element is very much on F1's priority list for promoters to execute. So I think we just need to keep doing what we're doing. It's going well at the moment.

> WE CAN'T CONTROL WHAT HAPPENS ON TRACK BUT WE CAN CONTROL WHAT HAPPENS AWAY FROM IT

You've now got a hotel and conference centre on site and another accommodation development – the Escapade – under construction. How close is that to completion?
It's coming on. There will be one which has been effectively set up as a show home for the British Grand Prix and I think people will be really wowed by the scale and presence. It's been a full-on seven or eight years but we really feel the wind in our sails in this broader diversified business. We're definitely delivering against some of the milestones we set ourselves.

The hotel has made a huge difference to the interest in our conference offering. Motor racing is a seasonal business so it's really important for us to drive revenue from our facilities during those months of the year when there's not much happening on track. Visitor numbers are significantly up at the museum, too.

How successful has your drive towards sustainability been?
Last year was good but this year will be much better. We've got twice as many solar panels on the roof of the Wing. We're not off-grid – our annual energy requirement involves big peaks around events – but we're able to meet our steady-state demand a significant amount of the time. The generators we bring in work on HVO [hydrotreated vegetable oil], which is 90% cleaner than diesel. We're trying to be the best we can in this field.

Modern Formula 1 crash helmets must comply with a 14-point testing process so demanding that only four manufacturers supply the entire grid. Schuberth showed *GP Racing* how it makes the likes of Max Verstappen literally bulletproof...

WORDS **OLEG KARPOV**
PICTURES **SCHUBERTH**

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Precision is everything. The giant cutting plotter draws lines, cutting triangles, trapezoids, strips of different lengths and more intricate pieces – some of which resemble squashed earthworms – out of dense fabric. Every millimetre counts. The plotter's programme is designed to ensure every square metre of material produces as many useful pieces as possible. Waste is kept to a minimum.

"These materials are very expensive, around 150 or 160 euros per square metre," explains Schuberth Performance CEO Alberto Dall'Oglio, the 'employer' of this impressive machine, which is busy cutting out hypometric pieces and 'worms' from a roll of carbonfibre, to *GP Racing*. Here, in the small Italian town of Schio, about 70 miles west of Venice, Schuberth creates the high-tech protection equipment which cradles the heads of three current Formula 1 drivers, including reigning champion Max Verstappen.

"There are a very limited number of materials on the market," Dall'Oglio adds, "and most of them are taken up by Formula 1 teams and the aerospace industry, so we almost have to fight for them."

The material in question is T1000, one of the most sophisticated and expensive available, used by F1 teams to build the monocoques of their cars. The cutting machine is five steps away from the fridge, since T1000 is as capricious as it is expensive – and must only be stored at around minus 15-20 degrees.

As delivered, the resin-treated carbon fibre is protected on both sides by a thin film. Alberto picks up one of the strips and releases the black fabric. "As soon as you take it out of the fridge, the material starts to activate," he says, as his fingers start to stick to the piece of fabric. "So we have to be careful and quick. From that moment on, the material is free, which means it starts to be sticky, like glue. The longer you leave it out, the more it becomes like chewing gum."

Speed has to be tempered with precision in the following stages of manufacture because this product is destined for a rarefied clientele and has to conform to stringent quality and safety requirements. The 8860:2018 ABP standard Formula 1 helmet is the most durable, intricate and therefore expensive helmet produced – not just in Schio, but pretty much anywhere in the world. Once a complete set of elements for the future head protection device has been assembled – a total of 95 such carbonfibre pieces per helmet – the collection is given a serial number, which contains all the information about which roll of which batch of fibre it was made from as well as when, and is sent to another fridge, one of those in the lamination room, which is another ten steps away.

A DECADE-LONG MISSION

As we enter what Dall'Oglio calls "the heart of the company" he asks us not to take any pictures. All of Schuberth's F1 secrets are kept in this football pitch penalty-area-sized room. It took Alberto's company 10 years of research and development to perfect the recipe of the aforementioned 95 pieces, which not only have to be precisely shaped, but also placed in a certain order – with millimetre precision. All in order to pass the FIA's latest crash-test regime, which came into force in 2019. Schuberth tested hundreds of prototypes in the year leading up to the switch to the new helmet standard – until it finally found the structure that would enable it to pass the toughest exam.

That's because F1 helmet manufacturers had no one else to learn from, as no other industry has the need for carbon spheres the size of a human head. In parallel, three other manufacturers – Arai, Bell and Stilo – have followed a similar path, and each company's technology is now valuable intellectual property.

"You can find this type of lamination room at Lamborghini or Ferrari, for example," says Alberto. "But you won't find anyone laminating on a spherical shape. And that's where our expertise comes in. Imagine you take a bowl and a piece of paper and you try to wrap the paper around the bowl – it will be full of wrinkles, right? Because how do you take a 2D shape and turn it into a 3D shape? That's where it took us 10 years to find a solution."

There are eight people in the room, all wearing white dressing gowns. It's not cold, but still a little chilly in the workshop: the temperature is a compromise between facilitating human comfort and calming the carbonfibre's predisposition to stickiness. Each of the workers is assigned to his or her own helmet. It takes one person at least five hours – almost non-stop – to painstakingly assemble the jigsaw of carbonfibre in the right order in a specially shaped bowl. Here, too, millimetre accuracy is crucial: every nook and cranny must be fitted into the shell, layer by layer, in strict accordance with the instructions. The sticky cloth pieces, which the Schuberth

With accuracy paramount an employee needs at least a year of training to be ready to work on the company's F1 helmets

employees take out of their refrigerators and free of protective strips, start to adhere to each other when placed in the bowl-shaped tool.

To achieve the necessary strength, there are several layers of carbonfibre in an F1 helmet, with the thickest area at the front. It's called 8860:2018 ABP for a reason, the last part standing for 'Advanced Ballistic Protection'. The new FIA standard was prompted by Felipe Massa's accident at the Hungaroring in 2009 – and it took a decade of rigorous research for the helmet manufacturers, working with the FIA, to develop helmets capable of preventing injuries like the one suffered by Massa.

The temporary solution was an additional cover at the top of the visor, but the new standard stipulates that the shell itself must be able to absorb such impacts. In Schuberth's case, the front section of the F1 helmet is the thickest at around eight millimetres. That's 19 layers of carbonfibre. A standard F1 helmet is made from about five square metres of raw material.

The ultimate challenge is to achieve a sufficient level of durability without making sacrifices in terms of the size and weight of the helmet, which is essential for driver comfort.

"Sometimes we have drivers or teams tell us, 'Oh, this helmet is 30g heavier, what happened?' 30g!" exclaims Dall'Oglio.

"People here have to be extremely precise," he adds, "and it's not easy because you're basically staring into a black hole. After a certain number of hours, you start to lose a bit of focus. So we keep them busy with handwriting: they have to mark every step they take in the checklist to keep everything under control."

Again, there's no university where this particular technique is taught. To be ready to start assembling helmets for F1, Alberto says, a person needs at least a year's training.

READY, STEADY, COOK

Those helmet-shaped bowls in which the Schuberth specialists place the carbonfibre are also manufactured here and made using carbon too, on aluminium billets. Metal tools are only used to make the carbon moulds, but not to bake the helmets themselves.

"We start with the aluminium tool, treating it like a mirror," explains Alberto's colleague Luca Menin. "Then we start laminating the carbon layer on top of the aluminium, so in the end we get a carbon tool that is much lighter than an aluminium tool and has more positive points.

"First of all, it's the same material that we're going to use for the shells. So we have the same thermal dilation, the same shrinkage, the same compatibility between the two materials. Aluminium certainly has a different behaviour when it gets heated or cooled down, and it's just not a very good way to work – because carbon shrinks less than aluminium, for example, so the aluminium tool can squeeze the carbon shell and cause some micro-cracks.

"What's more, when you put the aluminium tool in the autoclave, you have to wait three to four hours for it to cool down once you take it out. With the carbon, it's only 10 minutes. So it's easier to handle and it's quicker. But the main advantage of it is that the behaviour of the material is the same."

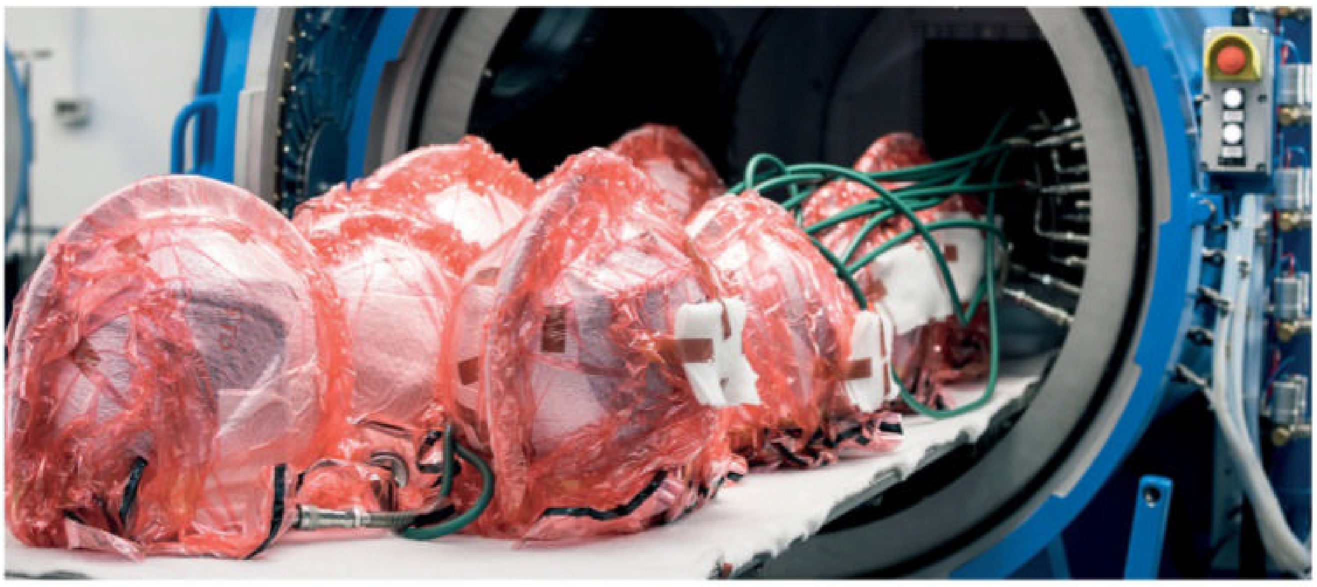
Like the helmets themselves, carbon moulds are also cooked in autoclaves, but with special technology because each of them will need to go into the furnace a few dozen more times.

"It's harder, it takes three days to cook in the autoclave," Luca says. "It's cooked in a different way. If the helmet takes about four hours to cook, this tool takes three days of cooking. It's a long process: let's say, about 80 degrees for 10 hours to start with, then a different temperature for a day, then lowering the temperature again, and so on. It's a secret recipe, there's been a lot of trial and error, but fortunately we have very experienced men here."

Towards the end of the lamination process, two carbon moulds will have to be screwed together and sent to a further station, where they will be wrapped.

"Basically, we have to enclose the tool and take the air out of it," explains Dall'Oglio. "It's a very important step, even if it doesn't look very technical or complicated. But it makes all the difference. If you don't do it right, the resin will flow away and you'll have defects."

Future helmets are wrapped in three different layers of packaging. First comes a simple Teflon film, then a special cloth to prevent any mechanical damage, and finally a vacuum bag



belotti
TRIM 2515
DATALOGIC

After the helmets emerge from the autoclave (above, left), the water-jet machine (left) is responsible for cutting holes in the shells

from which the air is evacuated after sealing. Once fully wrapped, future helmets will go into the autoclave to be heated to exactly 126 degrees.

"It's like a big oven," says Dall'Oglio, "but with pressure. Inside the tool there is a vacuum, a negative pressure, and outside the autoclave creates a positive pressure. The two together create the bond between the layers."

Resin and temperature will do their work, and what looked like a ball of fabric a few hours ago will become the strongest part of the helmet, which, according to Dall'Oglio, will not break even if an agricultural tractor is placed on top of it, despite the shell itself weighing just one kilo.

THE MOMENT OF TRUTH

As we watch the freshly baked shell being removed from the tools, Alberto says: "Every time it's like opening a present, because you don't know what's inside. You do your best to make sure you get what you want, but you never really know.

"From what we can see now, this is a perfect one, but then we'll go under the light to try and spot if there are any very small defects. Definitely this one looks quite promising."

The tightly controlled methodology of the manufacturing process means just 5% of the shells emerge from the autoclave with defects, but not all of these are immediately obvious. Just a few metres away is the quality control station where, under the light of a dozen lamps, Schuberth specialists check no damage has occurred during production.

The last step is to cut the holes for the visor and ventilation: the famous Schuberth gills at the chin and the small holes at the top and back of the shell. Like the initial cutting, this process is entrusted to a robot. A huge water-jet cutting machine has its own room – because it's quite noisy. The water stream it produces makes the holes with perfect precision.

"These machines work at 3800 bar," Alberto shouts over the machine. "So, just to give you an example, if you put a 10cm-thick piece of metal in there, it will cut through it."

By comparison, the average domestic pressure washer you might buy to clean your car or patio would emit water at 'just' 140 bar.

Of the three thousand or so carbon helmets produced in Schio each year, only a few hundred are made to the 8860:2018 ABP certification. The market price is up to eight thousand euros although Formula 1 drivers get theirs for free, because for Schuberth – as for other manufacturers – the F1 project is more of a marketing tool. If you want a helmet like Verstappen's, there is only one place to go.

This is just one stage in the process. The shells from Schio destined for F1 are shipped to Salzgitter, Germany, to designer Jens Munser, who paints the helmets for all three of the company's current F1 drivers. Once Munser has worked his artistic magic he sends the newly painted shells to Schuberth's headquarters in Magdeburg, where the padding, lining, straps and visor fixings are attached.

This is the responsibility of one of the company's longest-serving employees: Sven Krieter worked with the Schumacher brothers in the early 2000s, back when the Schuberth name first imprinted itself on the public's consciousness thanks to its association with Michael's astonishing run of world championship success. The product itself may have changed massively since then, but one significant connection to F1 history remains...

HOW F1 HELMETS ARE TESTED

To achieve 8860:2018 ABP certification a helmet design has to meet 14 stringent impact and flammability benchmarks. The manufacturer must keep records enabling the 'key materials' (including the liner and the energy-absorbing materials, fibres and resins) used in each production helmet to be traced. Every year a random sample must be re-tested. The FIA documentation laying out quality requirements and testing regime runs to 38 pages.

During the testing process each helmet is subjected to different temperatures to simulate potential storage conditions as well as various extremes of weather. Three different tests measure the resistance of the shell and the deceleration of the driver's head when dropped on a selection of different anvils at set speeds. In the standard frontal evaluation, the driver's head must decelerate by less then 275G in an impact of 9m/s.

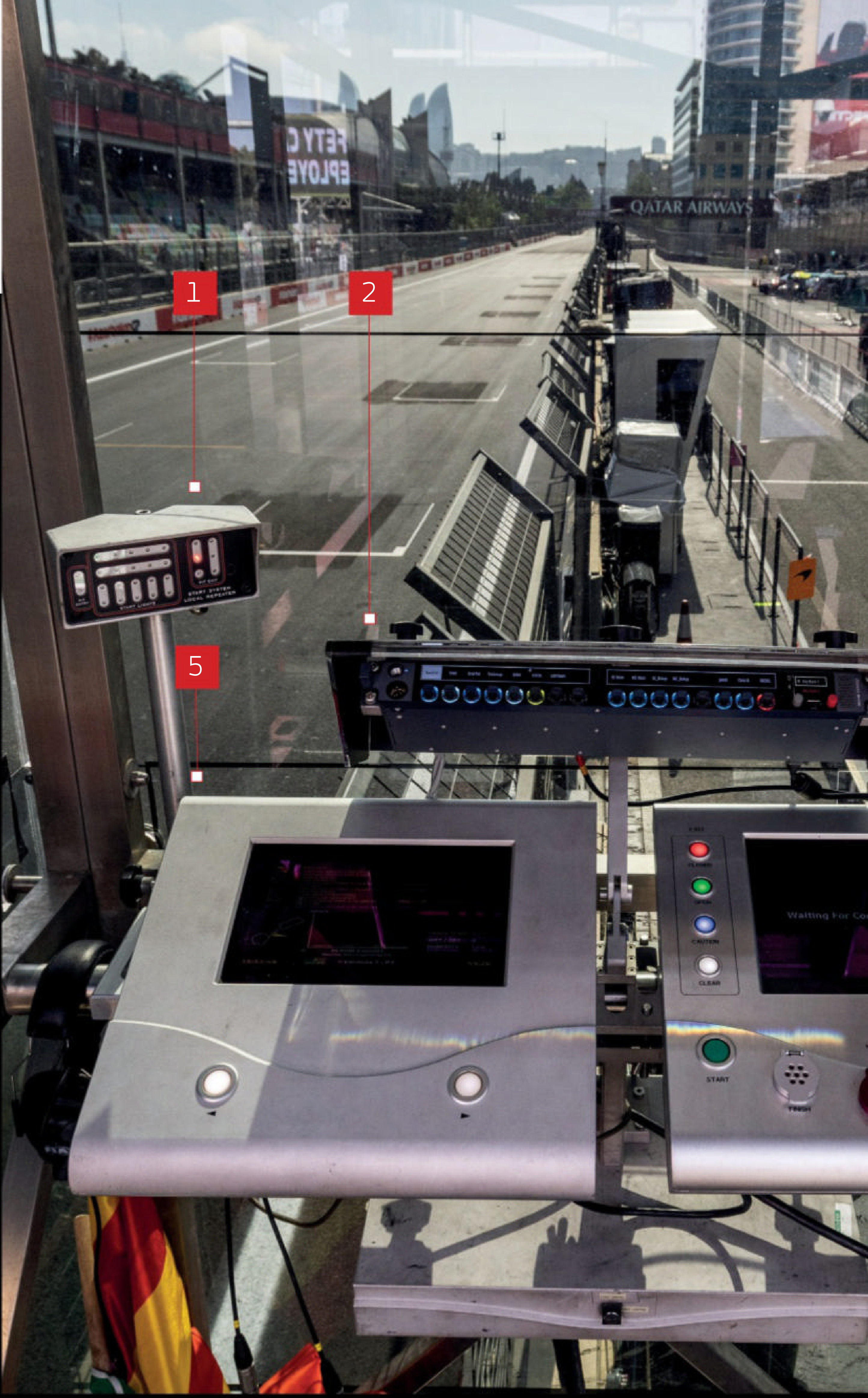
Ballistic tests are then used to check resistance to objects hitting the helmet; this is the key element introduced in response to Felipe Massa's accident at the Hungaroring in 2009, when a spring detached from the rear suspension of the car in front and hit Massa above the left eye. The penetration test requires a 4kg impactor to be dropped on the helmet from a height of 7.7m; the so-called advanced ballistic test involves firing 225g metal projectile at the reinforced forehead area at 250km/h.

Other tests crush the helmet and chin guard (separately), ensure the HANS device mounting points are strong enough and check the surface friction characteristics. Helmets must also self-extinguish after being exposed to a 790C flame...

WHO TURNS THE LIGHTS OUT?

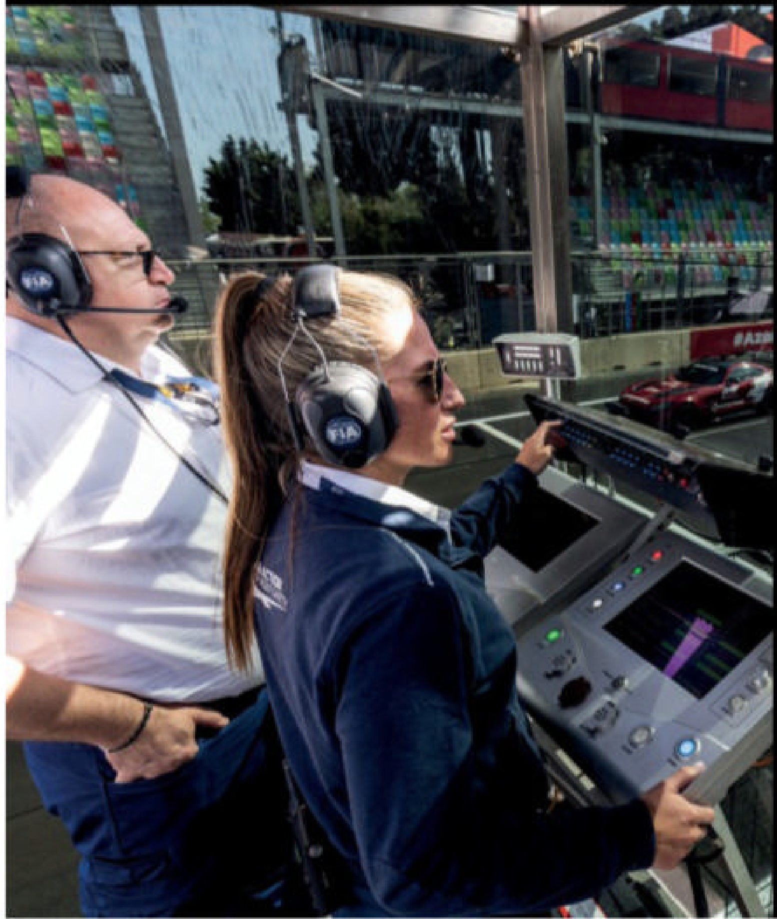
F1's permanent starter Christian Bryll explains the tools of his trade in the start gantry

INTERVIEW **OLEG KARPOV**
PICTURES **ANDREW FERRARO**



1

"What you see here is the start gantry with the equipment where we operate the start procedure for F1, F2, F3 and all the other support races during grand prix weekends. And on the left-hand side you can see a little box, which is a replica of all the lights we're controlling: the main one above the starting grid as well as pit exit and pit entry lights."

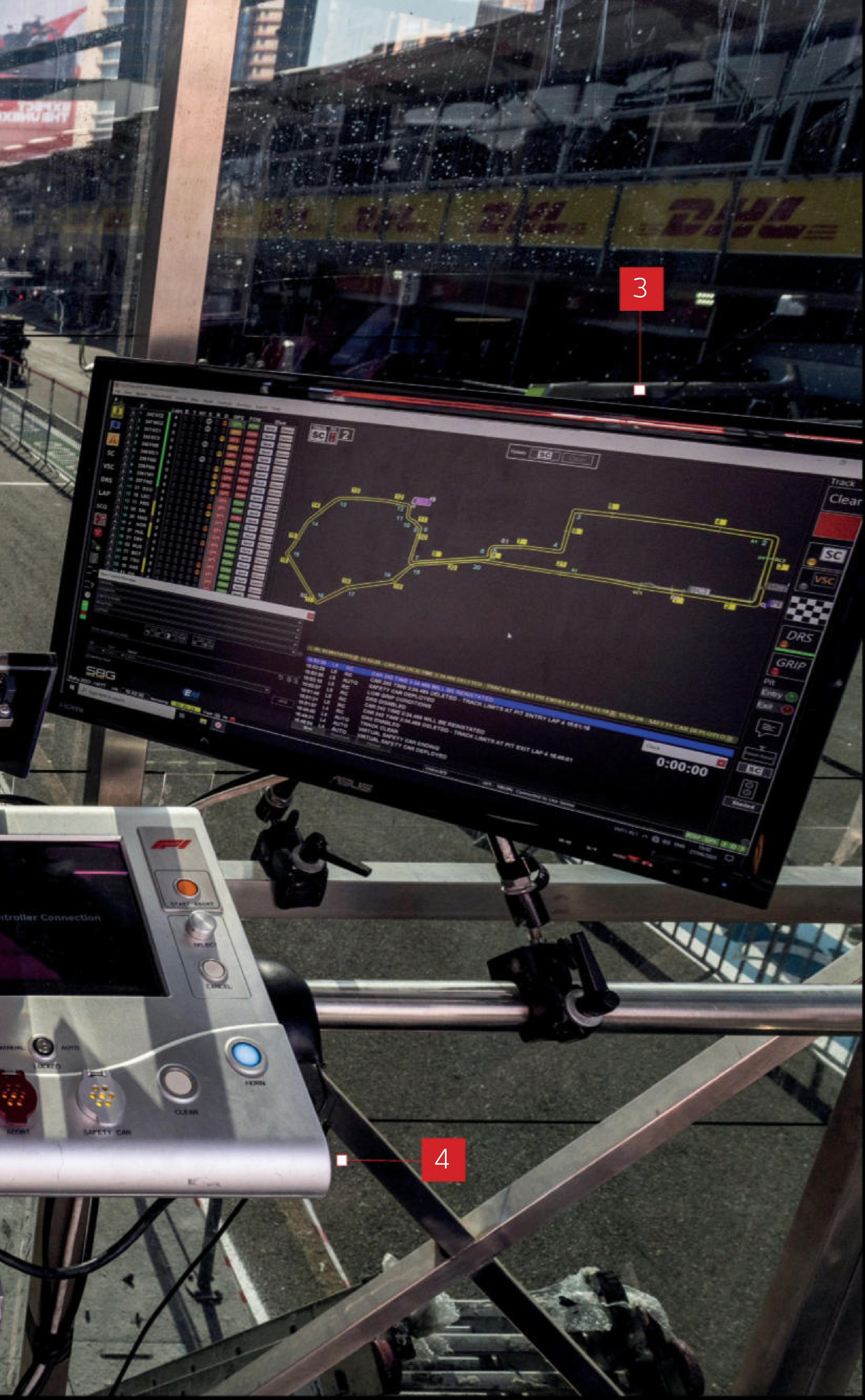


2

"With the intercom we stay in touch with race control, Safety and Medical cars. If we need to speak to them we can, but mostly we listen. In changeable conditions it's good to know what Bernd [Maylander, the Safety Car driver] says. If it's 'still puddles and aquaplaning', then we know it will take at least 10 more minutes before the start. We have a channel with our LED panels supplier, in case there's an issue, and our own channel where I can talk with my assistant Rebecca [pictured with Bryll]."

3

"The big monitor is mostly used to follow GPS, which is helpful during the formation lap to see if anyone has an issue. We have another window, which you can't see, for the grid formation: the system sends signals from our LED panels, located next to grid boxes. We want to see what we call a 'green wave'. When a driver arrives at his grid box, the marshal responsible presses the green button – and we'll have his position marked as green. As soon as all panels are green, the race can start."



4

"This is the main control panel where we're setting up the session. In this case you see the 'Waiting For Controller Connection' message, which means everything is being operated from the race control room – they have the same panel there as well. I have a key which gives me control, so when I'm here, I have to turn it – you can see the keyhole in the middle – and as soon as that's happened I'm in charge.

It's always just one party in control, so we don't interfere with one another. I normally keep control from the moment we begin our preparations for a race start and until at least after the first lap, because for race control these moments after the start are quite intense. As we're listening to what happens there, we wait until everything is a bit calmer – then I'll turn the key again and say, 'OK, you're in control now.'

"The system is quite old now, so we'll be replacing it soon. It was built for all kinds of eventualities, but we've never touched some of those buttons. It's good to have them there, but the new system will be a bit different as well.

"Buttons on the left-hand side are for the pit exit light. If we have a pitlane starter, for example, we'll wait until all cars pass – our monitor with GPS data helps here – and then give him a green light. There's also a 'caution' button for activating blue light panels on the pit exit.

"Then, on the other side there's a 'select' switch, which we use to choose the right scenario. We've programmed settings for all kinds of sessions, from free practices to different race start procedures in F3, F2, Porsche Supercup and whatever other support series we have.

"In the case of a Formula 1 race we have a so-called '50-minute format', since the pitlane opens 50 minutes before the start of the formation lap. The system itself knows when and what to do. There's a little pop-up window on the monitor which shows you exactly when to open the pitlane, when to close it and so on. As soon as all procedures are followed, the system will give a green light for the start of the formation lap.

"The 'Start Abort' button is self-explanatory. If I see any issue – either on the monitors, which for example can show that one LED panel shows yellow, meaning there is a problem with one of the cars, or if I see it myself through the window – I abort the start.

"Some of the buttons below are covered – to avoid accidents, because if you press them at the wrong moment, it's definitely not a good thing. 'Abort' here is basically a red flag.

As I keep control after the start, I sometimes have to stop the session by pressing this button, but only if the race director instructs me to do so – it happened, for example, after the last restart at the Australian GP in Melbourne.

Then there is a Safety Car button. I myself don't press it to send the Safety Car out, but we still use it sometimes – in case of a start behind the Safety Car and when the Safety Car is coming in. I have to clear the system, letting it know that the Safety Car returned to the pits by pressing that button,

5

"Finally, the monitor on the left-hand side of the gantry is used simply for showing the normal timing feeds that Formula 1 produces. Two buttons are there to enable us to switch between different data channels."

PASSING

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WILLIAMS RACING
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TIME

Drivers and fans are complaining that overtaking has got harder this season. Why, when Formula 1's 10 teams have gone to so much effort and expense conforming to new rules which were designed to create more overtaking opportunities? And why should overtaking be easy anyway?

WORDS ANDREW BENSON PICTURES motorsport IMAGES

FORMULA 1 HAS A PROBLEM

A year and a half ago, it introduced new rules which were aimed at closing up the field and making the racing more exciting, by enabling cars to follow each other more closely and overtake more easily.

At the time of writing, just before the Monaco Grand Prix, the lifespan of those new rules had been 27 races, of which 22 – 81% – had been won by Red Bull. Max Verstappen set a new record for wins in a season on his way to his second world title in 2022, and is well on the way to challenging that this year, when Red Bull's closest opposition is significantly further away than it was last season.

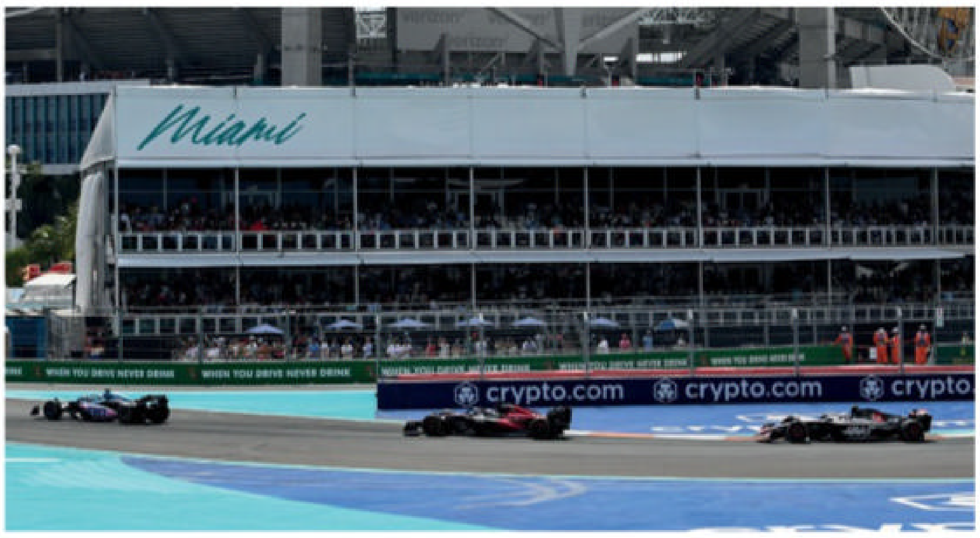
Those bare facts alone suggest the new rules have not had the intended effect. And on top of the statistics, the drivers are beginning to complain about overtaking becoming harder again in 2023.

Just four races into this season, discussions about that topic had already begun – first in the drivers' briefing at the Azerbaijan Grand Prix, and then in public after a largely uneventful race. They have continued ever since.

So far, discussion has tended to focus mainly on micro issues, such as whether the decisions by the FIA to shorten the zones in which the Drag Reduction System (DRS) overtaking aid can be used are right when overtaking has become more difficult. But that question rapidly leads on to other, wider factors.

Has overtaking become harder this year? If so, why? Have the new rules failed? And if so, what can be done about it, both in the short-term and looking further into the future? After all, Formula 1 is rapidly heading towards another change in the rules in 2026. If the current rules aren't working, what confidence can anyone have that the next set will be any more effective?

This year's Azerbaijan GP (below) was processional with very few overtakes although Miami (bottom), the following race, was better



HAS OVERTAKING GOT HARDER?

All the drivers have reported that overtaking is more difficult this year than it was in 2022.

Ferrari's Carlos Sainz says: "I don't know how long it's going to last, this raceability from this new generation of cars. Because they're getting more and more difficult to follow."

The new rules were formulated on the basis of reducing the 'dirty air' produced behind cars, so a driver behind retained a larger percentage of his car performance.

The mechanism for this was to reduce the ability of cars to 'out-wash' the air around them – a key method by which the previous generation of cars generated their downforce – and to force any turbulent air upwards, away from the car behind.

Up to a point, this worked last year. Cars did retain a significantly greater proportion of their overall downforce when behind another car, so following it more closely was easier. However, one corollary of the new design was already apparent last year – because the drag of the cars was reduced, so was the slipstream effect behind them. So while it was easier to follow, it didn't necessarily mean overtaking was much easier.

As a result, DRS was at least as important in allowing overtaking in 2022

Drivers have started to complain that overtaking is more difficult this season compared with 2022

If passing was too easy superb defensive drives, such as Alonso repelling a much faster Schumacher at Imola in 2005, couldn't happen

as it had been before – despite the fact that the initial hope of the rule-makers when they began research into the new generation of cars had been that they might be able to do away with DRS altogether.

DRS is still perceived as a necessary evil – an artificial tool introduced in 2011 in an attempt to counteract the difficulty of overtaking. The idea at the time was to make overtaking possible, not inevitable.

The combination of these two factors is what has led to the discussion about the length of the DRS zones this year. Governing body the FIA has been using data from 2022 to calculate the correct length of the DRS zone for each race. But, the drivers argue, that data is no longer applicable because the cars have changed.

"Is the DRS zone too short?" Verstappen says. "Are the cars not good enough to follow closely? I think it's a bit of a combination of both."

There are other factors at play, too, according to Fernando Alonso.

"We are very close in terms of performance," the Aston Martin driver says. "If you remove the Red Bulls, sometimes from P3 to P16 in Q1 is within 0.6secs. You finish qualifying in the order you deserve. And then in the race, how will you overtake a car in front of you that is just half a tenth quicker than you? It is your natural order. That is the main reason.

"And then it could be the tyres as well. They still get overheated quite heavily if you follow cars. You need to decide wisely when you want to be too close to a car in front of you."

In those remarks Alonso also addresses another, less talked about, aspect of the 2022 reset. Part of it was that Pirelli was supposed to supply tyres of a different character, which could be pushed harder throughout races – and follow other cars for extended periods of time – without suffering from the overheating that has plagued its rubber since it arrived in F1 in 2011.

To the surprise of very few in F1, it seems that has not happened.

DID THE RULES CLOSE UP THE FIELD?

Alonso's remarks raise the possibility of there being an inherent contradiction within the central tenets behind the new rules. What if one of them (bringing the cars closer together in performance) actually works directly against another (the aim of making overtaking easier)?

In 2019, looking at the average qualifying performance of all teams the gap between the fastest and slowest cars – the field spread – was 3.295 seconds. In 2021, the last year of the old rules, it was 2.578secs. This year it is 1.512secs.

However, those numbers aren't necessarily comparing like with like, because in every year from 2019 to 2021 there was one outlier team which had done a far worse job than everyone else – Williams in 2019, Haas in 2020 and 2021. Williams was 2.3secs down on the next slowest car in 2019, and Haas 1.4secs and 1.6secs in the following two years.

A fairer comparison, then, might be to look at the field spread of just the nine fastest cars from the three years preceding the new rules, leaving out the slowest one, especially since Haas essentially stopped developing its car at the beginning of 2020 to concentrate on the new rules.

In that case, the field spread in 2019, 2020 and 2021 was just over 1.9secs – exactly the same as it was in 2022 before the improvement for 2023.

So, yes, the new rules have closed up the field a little. The paradox is that this has not noticeably improved the quality of the racing, nor has it prevented one team developing an apparently unbridgeable advantage at the front of the grid.

The weight and stiffness of the current ground-effect cars means drivers tend to stick to very similar lines away from kerbs

DO THE RULES NEED A RETHINK?

So the new rules have worked in some ways – the field is more closely packed, and cars can follow each other more closely than before. But not in others – overtaking isn't obviously easier and one team is dominating.

On top of that, the cars have other failings – because they use the underfloor aerodynamics of ground effect to generate their downforce, they need a very flat, stable 'platform', which means they have to be run stiff.

Verstappen says: "The cars are probably too heavy, they're too stiff, so you can't really run a kerb to try to find a bit of a different line.

"Everyone is driving more or less the same line nowadays because of just how the cars work, and how stiff the suspension is. And, yeah, probably with people finding more and more downforce in the cars, it probably becomes a bit harder to follow as well."

> "The cars are probably too heavy, they're too stiff, so you can't really run a kerb to try to find a bit of a different line" **Max Verstappen**

That raises the question of whether ground-effect cars are indeed the right solution for F1 going forwards. Sainz, though, believes they are.

"I would personally love to go back to a more compliant car that doesn't mean we're all ending up with lower back problems and all that," he says. "And a narrower, lighter car. But ground effect still looks like for raceability as if it is the way to go."

Alonso adds: "It's a good question. There were higher expectations of following cars and maybe having the grid a little bit closer together but I think we need to give a little bit more time.

"If we didn't have the Red Bull that much ahead, it's a very interesting fight with three or four teams within 0.1-0.2secs and maybe we would be saying that the rules were a success. Maybe this is the story in a few years' time when we have some stability on the rules and then maybe in 2026 everything changes again!"

Alonso laughed as he said this, aware of the irony inherent in any new ruleset in F1. Often they're introduced with the intention of shaking things

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up; usually the result is one team steals a march and it takes a number of years before the others begin to catch up.

And so it is again. The backdrop to this debate about the present is that F1's power-brokers have already started to discuss another new set of rules that will accompany a change in engine regulations for 2026.

Active aerodynamics are part of that conversation. But not because of overtaking. The FIA has to find a way to drastically reduce the drag of the cars because the new engines will be significantly less efficient than the existing ones following the loss of the MGU-H, the part of the hybrid system that recovers energy from the turbo.

But the FIA's starting point for the new chassis regulations is that they will be a modification of the existing ones, with ground effect still used. The question of whether the new rules have worked, and therefore whether a more extensive rethink might be a sensible idea, hasn't yet been addressed to any significant degree. And if it is to be, time is rapidly running out.

THE BIGGER QUESTIONS

Wider questions arise from this debate. Specifically, what does F1 want to be?

There is general agreement that the ideal is for the field to be closer together so more teams can win; for the show to be better by virtue of overtaking being easier – but not too easy; and for the drivers to be tested and have to push to the limit, or much closer to it, at all times.

But it is in these detail discussions that arise from those generalities where things tend to get foggy.

On tyres, for example. In Miami, both George Russell and Esteban Ocon agreed one of the current problems was that the tyres did not degrade sufficiently. More degradation, Ocon said, meant "more fights and more fun on track". Russell added: "It's been easy one-stops in the last couple of races."

"We're pushing Pirelli to deliver a good tyre, a consistent tyre and when it is difficult, you know, the drivers, myself included, we don't like it" **George Russell**

DRS was first introduced in 2011 and is now an integral part of many of the overtakes that happen in current-day F1

The durability and performance of Pirelli's tyres has to be considered when F1 is looking at the issue of overtaking

In the same news conference Russell added: "We're pushing Pirelli to deliver a good tyre, a consistent tyre and when it is difficult, you know, the drivers, myself included, we don't like it. In an ideal world, you have a very strong tyre, which at a certain point falls off the cliff and means you have to do a few more pitstops and gives some different opportunities in the races."

Russell's comments make it clear that when he says "degradation", he is talking about tyres losing performance by deterioration, not rubber that has to be driven carefully because of its propensity to overheat. Yet in F1 these two very separate phenomena are often conflated – not least by Pirelli itself.

Equally, after bemoaning the difficulty of overtaking in Baku, the drivers discussed the matter again with the FIA in their briefing in Miami. "All 20 drivers," Russell said, "came to the conclusion we'd prefer it to be slightly too easy than slightly too difficult."

Meanwhile, in the run up to Baku, F1's Twitter feed promoted a video of the 2005 San Marino Grand Prix, a race won by Alonso after holding off Michael Schumacher's much faster Ferrari for many laps, a performance that has come to be viewed as one of the greatest defensive drives in history.

Another example of such a performance would be the 1981 Spanish Grand Prix, when Ferrari legend Gilles Villeneuve held off a train of four cars for close to the entire race to secure his final and arguably best victory.

If overtaking is made "slightly too easy", these type of drives would be impossible. It could be argued that, because of DRS, they already are. Whether that is right is a question no one in authority seems to be asking.

As for whether F1 can expect more processional races in the future, Alonso says: "Could be. But this is F1. It has been always like this. It has been seven years with Hamilton and Bottas first and second. It has been in the past Vettel and Webber.

"If you have the fastest car, you can start a little bit behind and you still maybe make some moves and overtakes. And if you're in any other car, we're all within 0.1secs or whatever. So wherever you qualify you're still more or less securing that position and there aren't many overtakings after lap two or three.

"To not see many overtakings is the nature of Formula 1, so it should not be a surprise."

Andrew Benson is BBC Sport's chief F1 writer

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NYCK DE VRIES

10 THINGS I LOVE

Tailoring, tennis and tickling the ivories rank among the Dutch racer's favourite off-track interests

Mini Moke

The first car I ever bought myself and I still own it. It's a 1987 Mini Moke. I bought it in Italy and completely restored it. I initially wanted to restore it with my dad. That was the original plan, but with our schedules there's just no chance, so I've done it by myself.

PICTURES: SAM BLOXHAM; SHUTTERSTOCK

The piano

My education was quite isolated, mainly focused on racing. Even though I had other interests, that was my main occupation. So I never learned to read notes, I never played an instrument. But I've always loved the piano. And it was during lockdown that I had the idea of learning to play. But because all the deliveries were so delayed, I didn't get my digital piano until after the lockdown. Anyway, I started lessons for about seven or eight months, but then with the travelling I just couldn't keep it up and I kind of just stopped, which annoyed me a bit. Last year I told myself that if I make it to F1 I'll just forget about it, put it in the basement and leave it there for a while because I'll have other things to worry about.

SC Heerenveen

That's the local football club in my province. SC Heerenveen used to be the only team from our province [Friesland] playing in the top national league, and it's still the bigger and better one. I wouldn't say I'm a die-hard fan, but I always supported the team and went to a lot of games when I was a kid. My helmet has the same colours and design elements as the team's jerseys, too.

Tennis

A lot of tennis players used to live, or still live, in the same building as me in Monaco. And they go to the same gym. So being around them naturally makes me interested. I enjoy their company and Stefanos Tsitsipas took me to one of his games recently. He's a very, very nice guy. I played a bit of tennis myself, just for fun. But mostly I like to watch. I have Tennis TV on my phone so I do watch it regularly.

Toad

I'm not into computer games and have never liked them very much. But if I were to play a game, it would have to be Mario Kart. When I was a kid, I always chose Toad because I thought he was the fastest!

Made-to-measure clothing

Well, I'm small. And made-to-measure is the way to go. Because it's not so easy for me to buy it off-the-peg. The way you dress is a way to express yourself a little bit and I think it also represents your personality. So I like it when it fits!

Sports documentaries

I don't watch much Netflix or Amazon Prime. But when I do, I love to watch sports documentaries. Break Point [tennis], Full Swing [golf], Hitting the Apex [MotoGP]. I really love those!

Speed skating

Speed skating is very popular in our country. It's our best sport in the Olympics, so everyone grows up with speed skating. I follow it quite a lot, and I've done a bit of it myself as a kid. I wouldn't say I'm good, but I'm not too bad. There's a unique tour in our province, it's called the Elfstedentocht, it's about 200km and it goes through 11 villages. I've never done it myself because it was never possible in my existence because there was never enough ice – but one winter we did a 50km tour with the family.

Being on the road

Staying in the same place for a month makes me restless. I always feel like I need to be doing something, going somewhere. I always want to have a purpose. Let's say I like to be busy. Obviously when I'm at home I'm preparing and training, but I still feel like there's less purpose when I'm at home than when I'm travelling to races. Of course I always appreciate the feeling of coming home. But if I spend too much time there, I just want to leave!

Perfection

Some might say that I'm obsessed with details, but I just like perfection. I'm definitely a perfectionist. I think anyone who has ever worked with me or spent time with me knows that. I like to be tidy, organised. It's just my character, I was brought up that way and I think everyone in my family has a little bit of that. We just like things done properly.

NOW
THAT
WAS
A
CAR

RED BULL RB10

No. 119

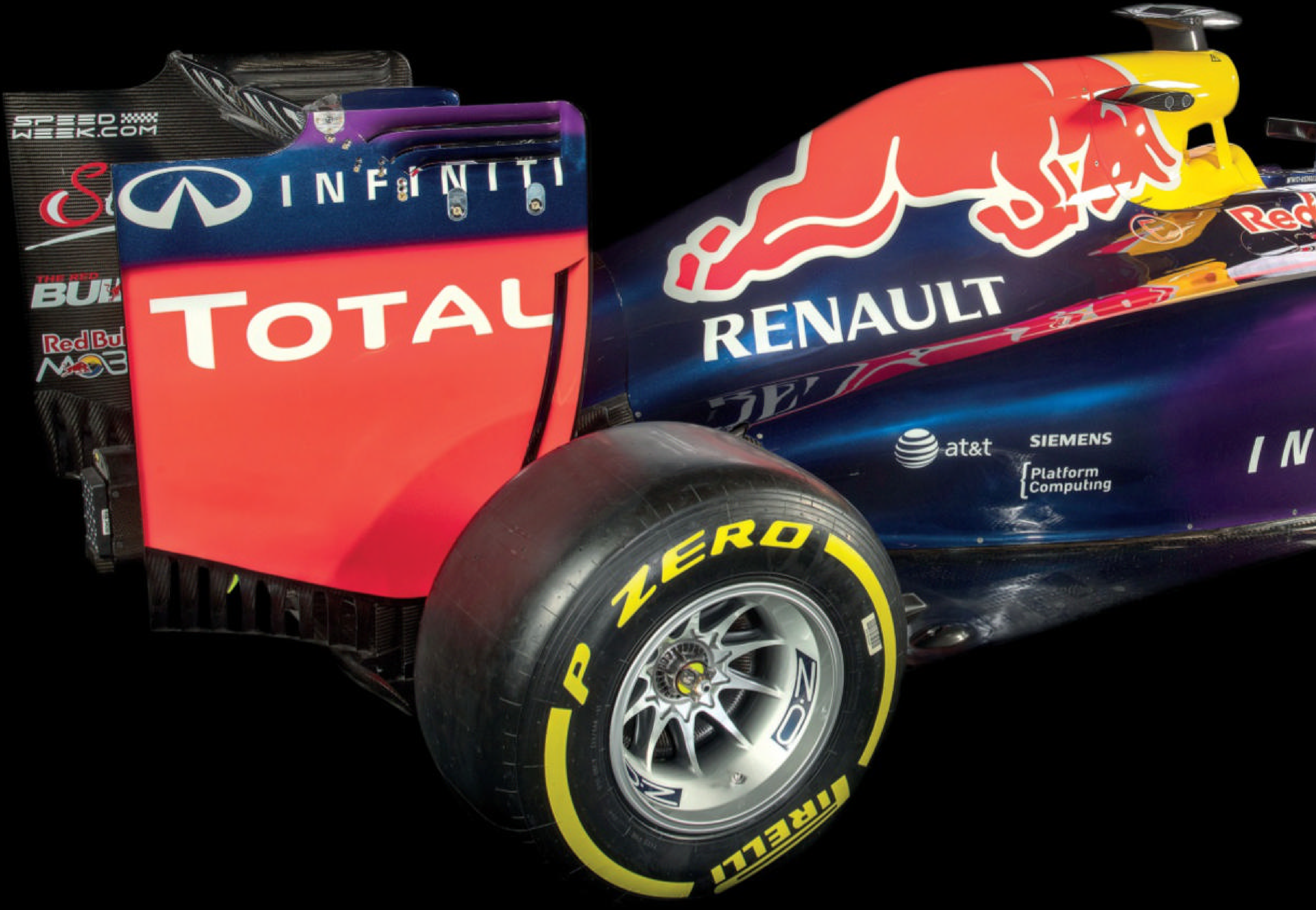
WORDS
STUART CODLING
PICTURES
JAMES MANN

Red Bull's first hybrid was a disappointment but still won in Canada, Hungary and Belgium

INF
RAUCH
Pepe Jeans
RAUCH
Red Bull

It's widely believed that major changes in the technical regulations can also upend the form book, handing an opportunity to the most boldly innovative teams. In reality the best-resourced organisations usually prevail unless they've been distracted by in-season development during the run-up to the change. For 2014 Formula 1 and the FIA sought to improve the on-track competition by neutering certain elements of aerodynamic development. At the same time they implemented a long-planned change to the engine formula, introducing 1.6-litre turbocharged hybrids in the hope that greater relevance to developments in the road car industry might stem the exodus of manufacturers and attract new ones.

As history records, the results were mixed. Just one new manufacturer entered the fray while one of the loudest cheerleaders for the format lost its appetite. But on the racetracks the long-established dominance of Red Bull and Sebastian Vettel were shattered, largely because Mercedes had worked harder for longer on the new engine package and solved many of the technical problems other suppliers were only just beginning to encounter as the new era approached. Having won a record-breaking nine consecutive grands prix in the second half of 2013 Vettel, the sitting world champion,



would not claim another victory for the organisation which had furnished his path to Formula 1.

For the previous four seasons Red Bull had enjoyed a dominance born of hard-earned aerodynamic superiority. The common – and overly simplistic – view is that the team pursued and perfected the 'high-rake' concept early and reaped the benefits, taking a risk on raising the rear of the car to boost the downforce potential of the diffuser and mitigating the downsides before anyone else.

This narrative glosses over many of the details. The key discovery Adrian Newey's team of aerodynamicists made was that the deformation characteristics of the Pirelli tyres had a damaging effect on crucial airflow structures around the rear of the car during cornering. Modelling the sidewall flex accurately in simulation required a great deal of effort and resource but it paid off in terms of enabling Red Bull and Renault to maximise the potential of using the exhausts to 'blow' the diffuser.

Renault's willingness and ability to play tunes with engine mapping was a crucial element of Red Bull's success in this era. But there was a malaise behind the scenes. Renault had under-invested at the beginning of the V8 engine era, taking the 'freeze' on engine development at face value and cutting back on staff and resource. When rivals exploited loopholes to smuggle performance upgrades through in the name of reliability improvements, Renault had to plead for special treatment from the FIA to catch up. When the governing body first mooted the hybrid power unit regulations Renault was one of the keenest advocates, even suggesting it might quit F1 unless the engine rules were made more 'road relevant'. During the interim between agreement and implementation, though, it had gone cold on the idea.

In his autobiography *How To Build A Car* Newey recounts a meeting with Carlos Ghosn, then the ultimate boss of Renault, from which Newey left with the gloomy impression that Red Bull's long-time engine partner had little interest in committing the necessary funds to the hybrid engine project. This belief was confirmed when the new 1.6-litre turbocharged hybrid V6 power unit was installed in the RB10. During the first four-day pre-season test at Jerez, Red Bull completed just 21 laps.

Renault's PU had arrived thoroughly undercooked, with a broad spread of intersecting problems. The internal combustion engine itself was behind the curve but there were other hardware issues in the interconnected hybrid systems and the software managing these also required development. Other clients endured a troubled opening test but Red Bull's problems were compounded by the tight packaging of the RB10, which made it prone to overheating. A temporary fix to the engine mapping enabled it to run at reduced power on the final day of the Jerez test but it wasn't until the third and final test in Bahrain that the team strung together a meaningful on-track stint which extended into double figures. Even this required more holes in the bodywork to improve cooling.

As a result of the disrupted pre-season, both Red Bull and Renault arrived at the first round in Australia in catch-up mode. Nevertheless new recruit Daniel Ricciardo, promoted from the Toro Rosso junior squad, managed to split the dominant Mercedes in qualifying – albeit in a session interrupted by rain. He would be on the front row while Vettel, hampered by a failed software update which compromised his power unit's driveability, started from 12th on the grid.

Polesitter Lewis Hamilton's Mercedes was beset by an electrical short in a spark plug which prompted him to withdraw after two laps, while Vettel barely managed one more tour before his power unit expired. Hamilton's team-mate Nico Rosberg surged through from third on the grid to take a commanding win from Ricciardo, who defied the odds by getting his RB10 to the finishing line, albeit nearly 20s down.

Barely had Ricciardo delivered his trophy to the Red Bull ▶

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OTHER CLIENTS ENDURED A TROUBLED OPENING TEST BUT RED BULL'S PROBLEMS WERE COMPOUNDED BY THE TIGHT PACKAGING OF THE RB10

INFINITI
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OZ
RENAULT
CASIO

Red Bull
D. RICCIARDO

motorhome, though, when he was required to give it back. The live data stream from the FIA-homologated fuel-flow sensor had reported his car exceeding the limit of 100kg/hour, thereby potentially gaining an advantage.

While cars were only permitted to carry 100kg of fuel under the new technical formula, by definition fuel isn't used at a constant rate during the course of a race. Managing fuel flow was a fundamental tenet of the new 'road-relevant' regulations which aimed to prioritise efficiency and drive technical innovation which would trickle down into the road car industry. Essentially the fuel-flow sensors work by passing an ultrasonic pulse through the liquid and using the 'time of flight' from one transducer to the other to calculate flow velocity. Smart watches and other wearable devices operate on a similar principle, albeit with optical sensors, to measure heart rate.

The Melbourne fuel-flow imbroglio has some parallels with Red Bull's more recent skirmish with the budget-cap regulations. On both occasions the team clung pugnaciously to its belief that its interpretation and conduct were correct, very much against the prevailing winds.

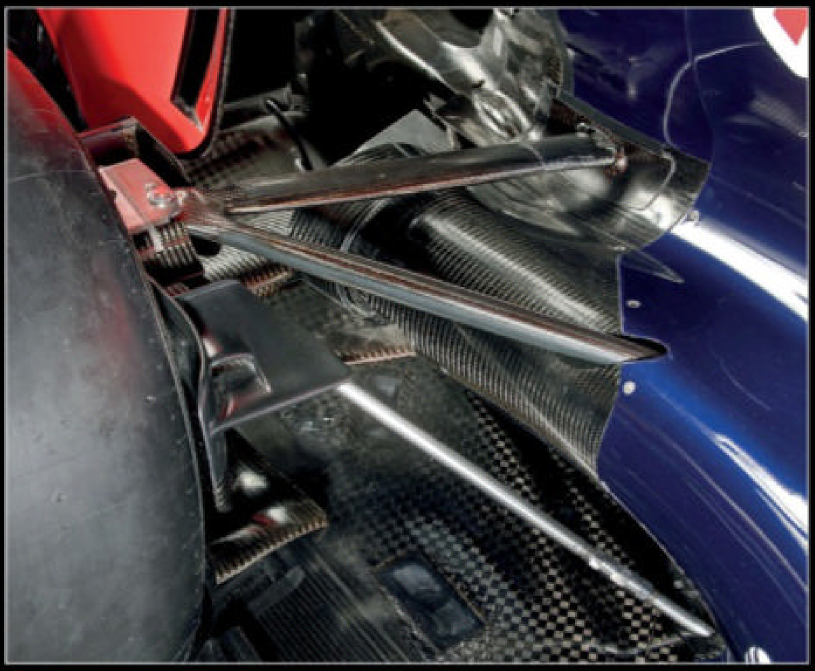
Fuel flow remains a key pillar of F1's hybrid philosophy, such that in 2020 the FIA mandated a second (encrypted) sensor per car to ensure teams weren't circumventing the 100kg/hour limit. In 2014 Red Bull's was the first scalp claimed by the system. The FIA's stewards at the Australian Grand Prix said Ricciardo's car had "consistently" exceeded the limit. Red Bull's riposte was to suggest the sensors weren't fit for purpose and

THE FOCUS ON ADDRESSING THE POWER UNIT DURABILITY SHORTCOMINGS CAME AT A COST TO PERFORMANCE

RED BULL RB10

NOW THAT WAS A CAR

No119



its own measurements indicated a discrepancy between the actual fuel flow and that claimed by the sensor.

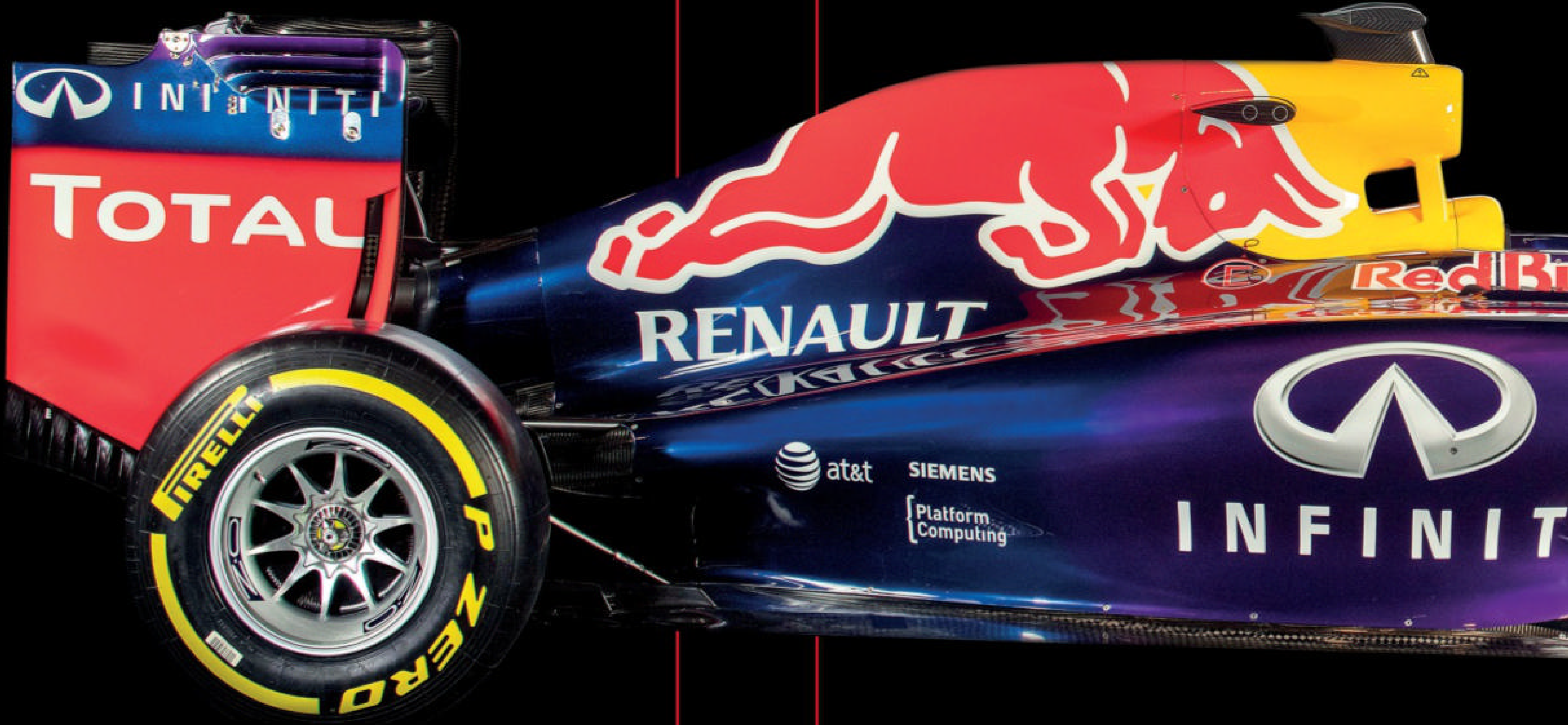
Certainly there was some merit in Red Bull's argument – the sensor had malfunctioned during Friday and its replacement had failed in qualifying – but the fuel-flow limit was too important a concept for the governing body to allow teams to start pushing the boundaries of what was permitted. A month later the FIA's court of appeal upheld the disqualification and, in so doing, established a precedent that the readings of the fuel-flow meters weren't open to question.

To Renault's credit, it resolved many of the race-day durability issues relatively quickly and Red Bull would suffer just two further retirements related to the power unit and its electronics throughout the season. But the focus on addressing the power unit durability shortcomings came at a cost to performance, given that development was tightly restricted by the FIA's system of 'tokens'. To keep the show on the road, the power unit often had to be run in lower power modes – and, in an era of rationed development, raising that ceiling was a challenge. Vettel claimed a podium in China, Ricciardo in Spain and Monaco, but took the chequered flag up to half a minute and more behind the dominant Mercedes.

While car reliability issues were largely confined to practice, Vettel was struggling with his RB10 to such an extent that the team gave him a new chassis for Spain. While the team initially described this as a scheduled change, it was Red Bull's 'driver advisor' Helmut Marko who, characteristically, let slip the truth that a crack in the structure was suspected if not located. Despite having this comfort blanket thrown around him, however, Vettel continued to be outperformed on track.

Also in Spain the team introduced a comprehensive car upgrade comprising new front and rear wings, revised suspension, and a new engine cover and floor. While the Barcelona race, the first of the so-called 'European season', was traditionally one where teams introduced update packages, this was remarkably extensive – tantamount to a B-spec. In subsequent years a pattern would emerge in which Red Bull would start the year with a very basic car and then only really kick on after adding a definitive spec from Spain onwards.

It had been observed that, apart from its aggressive packaging and the cunning ruse of mounting the mandatory TV camera in a slot on the nose rather than on pylons (banned from Monaco onwards), the RB10 appeared rather unsophisticated for a Newey car from launch. The question ▶



RED BULL RB10

NOW THAT WAS A CAR

No119

was, what was Red Bull's design guru up to? As it turned out, quietly hating the new technical formula. He would also, later, admit to being… if not distracted, certainly otherwise engaged at times, by approaches from rival teams for his services. Niki Lauda made a concerted effort to bring him to Mercedes but Newey came closest to signing for Ferrari, only making his decision after a number of visits to Italy. Ultimately the draw of attending to his teenage children and his new partner dissuaded him from relocating.

To keep Newey in the fold Red Bull had to make a number of concessions, creating a new entity – Red Bull Advanced Technologies – for him to head up, enabling him to recharge his dwindling enthusiasm for F1 by dabbling in side projects such as a putative Americas Cup programme with Olympic medal-winner Ben Ainslie. While this project faded inconsequentially, Newey did throw himself into the co-development of the Aston Martin Valkyrie.

Vettel's fluctuating form continued to be one of F1's major narrative threads into the autumn as Ricciardo won in Canada, Hungary and Belgium. While these were poacher's victories – Mercedes had brake problems in Canada, Hungary was rain-affected, then in Canada the two Mercedes drivers suffered damage in collision with one another – Ricciardo earned them by being at the head of the pursuing pack. While Vettel had the greater share of technical issues he looked erratic and rattled. After qualifying third in Belgium Seb made an impetuous early move on Nico Rosberg's Mercedes and clonked over the speed bumps in the run off at Les Combes, finishing fifth after a late-race punt from behind by Fernando Alonso.

For the following race Vettel had a 'new' chassis (actually one previously used in testing), ostensibly because of damage incurred in Belgium, but for Singapore at the end of September the team built an all-new monocoque. As ever, Helmut Marko failed to keep his counsel, divulging that this was more for

NIKI LAUDA MADE A CONCERTED EFFORT TO BRING HIM TO MERCEDES BUT NEWEY CAME CLOSEST TO SIGNING FOR FERRARI

3
PIRELLI
P ZERO
TOTAL

Vettel's psychological benefit than for performance. A schism between the team and its star pupil which had been developing behind the scenes was beginning to be visible to the public.

An opportunity was opening up at Ferrari, where Alonso was in the throes of a catastrophic fall-out with new team boss Marco Mattiacci – himself not too long for the Scuderia's employ. In early October Vettel triggered a release clause in his contract which enabled him to leave Red Bull if he was below third in the championship (subject to the cut-off date of the forthcoming Japanese Grand Prix).

Thus Vettel's Red Bull career ended on a downbeat note of competitive disappointment. In the final round at Yas Marina, amid the hype surrounding the absurd granting of double points for the season finale, both RB10s were thrown out of qualifying when their front wing elements were discovered to be flexing beyond the permitted 10mm when subjected to a 1000Nm. With typical bolshiness the team claimed it had been "singled out" and that others were "interpreting the rules in a similar fashion". In an otherwise processional and jejune encounter, Ricciardo raced from the back of the grid to fourth, making a key early overtake on Kevin Magnussen – behind whom Vettel became stuck, limiting him to eighth at the flag.

The RB10, not one of Red Bull's best cars, therefore signed off its career on a suitably defiant note – in Ricciardo's hands at least. And while Vettel would show signs of his old spark and win again with Ferrari, yet more career turbulence lay ahead...

3
Pepe Jeans
RAUCH

RACE RECORD

Starts 38
Wins 3
Poles 0
Fastest laps 3
Podiums 9
Championship points 405

SPECIFICATION

Chassis Carbonfibre monocoque
Suspension Double wishbones with pushrod-actuated spring and dampers (f), pullrod-actuated spring and dampers (r)
Engine Turbocharged Renault Energy F1-2014
Engine capacity 1598cc
Power 760bhp @ 15,000 rpm
Gearbox Eight-speed semi-automatic
Brakes Carbon discs front and rear
Tyres Pirelli
Weight 690kg
Notable drivers Sebastian Vettel, Daniel Ricciardo

MAURICE HAMILTON'S ALTERNATIVE VIEW

Random officials and meandering photographers in the pitlane? It's been seen before – with a shoddily parked Ford Cortina thrown into the mix...

PICTURES motorsport IMAGES

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NOT FOR THE FIRST TIME, I FOUND myself wishing Niki Lauda was on hand for a quick quote, just to put the latest Formula 1 nonsense in perspective. The thought occurred while watching the shambles in Baku as Esteban Ocon steamed into the pitlane on the reasonable assumption that it remained part of the field of play rather than resembling Paddy's Market. After using typically salty language to address the FIA's uninformed decision to begin erecting parc fermé barriers and open the pitlane to all and sundry, Lauda would surely have mentioned Ocon's good fortune in at least being able to continue.

Niki would have recalled the 1974 British GP. Trying to emerge from a last-lap tyre change, he found the end of the Brands Hatch pitlane blocked by a mass of hangers-on – with an official car parked in their midst. It was crucial for many reasons, not least being that Lauda and Ferrari had been leading their respective title races going into this 10th round of the championship. They came out of it a chastened and angry second on both counts. The fact that Lauda would not have won anyway because of a puncture played little part in Ferrari team manager Luca Montezemolo's impassioned and indignant tirade directed at bungling British officialdom.

That was the main difference between then and now. The race had been organised by the Royal Automobile Club (RAC), headquartered in London's Pall Mall. Appointed by the RAC, the race stewards included a British peer (The Most Honourable The Marquess Camden), plus a highly decorated RAF Squadron Leader and the head of an international oil company. Only the presence of driver and Porsche team manager, Huschke von Hanstein, represented anyone with the slightest hint of a motor racing mindset within this collection of 'frightfully good chaps'. The significance of this deficiency would show itself in the incompetent finish to – according to the official programme (price 30p) – 'Britain's Greatest Motor Race'. Until that moment, everything had been, as the stewards might have said, tickety-boo. Or 'tutto bene' as Ferrari probably felt for the first three quarters of the 75-lap race.

Lauda had been establishing himself at Ferrari, scoring his first two F1 wins in Spain and Holland. Pole at Brands Hatch, followed by an immediate and unchallenged lead, suggested a third was about to follow. Then, with 20 laps to go, Lauda felt the handling begin to deteriorate for no obvious reason. It was the eagle-eyed Jackie Stewart who spotted the cause.

It was less than year since the three-time world champion had retired. Stewart recalled many hours spent tyre testing with the mirrors of his Tyrrell focused on the rear Goodyears. Commentating for BBC TV, Stewart recognised a slight dip in the profile of Lauda's right-rear and suggested the Ferrari would be forced to change the punctured tyre. This was long before the blink-and-you'll-miss-it machine gun orchestration commonplace today. Having eventually worked out the cause of the Ferrari's loose handling, Lauda knew it would take about 15 seconds to change the wheel. With most corners being right-handers, the car felt manageable and prompted his decision to continue. Besides, while Jody Scheckter's Tyrrell would quickly close down Lauda's eight-second lead, the next two runners were literally miles

A MARSHAL WITH A RED FLAG TOOK IT UPON HIMSELF TO STAND IN FRONT OF THE FERRARI, INDICATING LAUDA SHOULD GO NO FURTHER

Jody Scheckter takes the flag to win the 1974 British GP with Lauda, hidden in the pitlane, blocked from rejoining by that pesky Cortina...

Nearly 50 years on from Brands, there was another officiating shambles as Ocon came in to make this last-lap pitstop in Baku

behind and separated by up to half a minute. The rest of the diminishing field – there would be 11 retirements – had been lapped (and we complain about dull races today).

With four laps to go, Emerson Fittipaldi moved his Lotus into second place. Lauda's hopes of a podium ended on the last lap when the rear Goodyear finally gave way, shredding rubber in all directions. Lauda limped into the pits, where the mechanics seized on the 312B3-74 and changed the wheel in 14 seconds (described by one contemporary report as "double-quick time"). Meanwhile, Scheckter crossed the line to win his second race for Tyrrell.

Knowing the timing line was beyond the pit road, Lauda aimed for the exit knowing he would be credited with the two points for fifth place if he completed the lap (points being awarded 9-6-4-3-2-1). Such technicalities had long since been lost on the official in charge of the pitlane. An outraged editorial by Ian Phillips in the following edition of *Autosport* summed up the absurd scene as Lauda was confronted by a mob, not to mention a Ford Cortina positioned in readiness for the lap of honour. Even worse, a marshal with a red flag took it upon himself to stand in front of the Ferrari, indicating Lauda should go no further – as if he had the choice.

"The situation was ludicrous," thundered Phillips. "The RAC system of allocating pit passes was generally beyond comprehension. Bona fide journalists were refused proper passes, while notorious hangers-on got them and abused them. Consequently, the pit road was permanently filled with people who had absolutely no right to be there. The officials, who had a hospitality caravan virtually on the start line (in which they seemed to spend the majority of the meeting), just did not have a clue what was going on."

Certainly, the stewards did not know what to do next when confronted by an outraged Montezemolo, demanding Lauda be elevated from ninth. An official protest was rejected nine days later. While having little option but to accept that Lauda had been blocked unnecessarily, the RAC officials felt they did not have the power to alter the results of an international race. Ferrari lodged an appeal with the FIA, and the governing body's tribunal agreed to promote Lauda to fifth.

As it happened, the extra two points would make no difference to his eventual fourth place in the championship, Lauda having frittered his chances with uncharacteristic driving errors. Still smouldering, Ferrari claimed Lauda's subsequent inconsistent performances had been caused by the mental stress brought on by the Brands Hatch bedlam. Were he with us today, Lauda would probably agree such an excuse was just as absurd as Baku officials having no idea that Ocon was about to make a wholly predictable pitstop.

Ferrari's Montezemolo at Brands in '74 (above). The treatment of Lauda (below) caused the team manager to confront the stewards...

CATERHAM
PIRELLI
Re

Although he had this crash in Japan, Giedo van der Garde finished 17 races in 2013 with Caterham. He nearly returned to F1 in 2015

ONE AND DONE

Formula 1 history is liberally sprinkled with drivers who contested just a single season – or less. But some of these arrived with impressive competition records and could have achieved more – what happened to cut these promising top-flight careers so short?

WORDS JAMES NEWBOLD
PICTURES motorsport IMAGES

1950 | Raymond Sommer

A fiercely independent streak meant Raymond Sommer won fewer races than perhaps he should have done. As such it's difficult to say what he might have achieved, beyond his tally of three points from five world championship appearances, had he not crashed fatally aboard a Cooper in a minor event at Cadours in September 1950.

But the two-time Le Mans victor had a giant-killing streak that he'd displayed in defeating the mighty Alfa 158s with his private Maserati at St Cloud in 1946. And when the world championship began in 1950, Sommer even led at Spa aboard his privately entered Talbot-Lago after the hitherto dominant 158s pitted for fuel. It prompted panic and even disbelief from the Alfa pits, who lobbied the timekeepers that he couldn't possibly be on the same lap.

The inaugural BRM driver, whose V16 never made it off the startline at the International Trophy, Sommer was respected enough to have driven for all the period's top-line manufacturers and scored Ferrari's first grand prix podium as a constructor in 1948. He just preferred to drive his own car.

1973 | George Follmer

Time wasn't on George Follmer's side when he made his F1 debut with Don Nichols' new Shadow team in 1973. A latecomer to racing, the former insurance salesman was already 39 and had a short window of opportunity to impress aboard Tony Southgate's DN1.

But despite team-mate Jackie Oliver's superior experience it was the versatile Follmer – reigning champion in Can-Am and Trans-Am, plus a previous winner in Indycars and F5000 – who delivered Shadow's landmark first point and podium. Attrition aided the Californian's rise from 21st to sixth on debut at Kyalami and from 14th to third at Montjuïc Park. Oliver won their qualifying head-to-head 7-6, but the pair were often closely matched and on nine occasions split by two or fewer cars.

Follmer didn't score again in Formula 1 as he juggled a race-winning Can-Am title defence. The ire he received from François Cevert for doggedly defending in Spain likely underlined his feeling of being a fish out of water, so it was unsurprising that Follmer returned to and focused on lucrative domestic competition thereafter.

1975 | Tony Brise

The single point achieved in F1 by Tony Brise prior to his death in an aircraft accident (which also claimed Embassy Hill team boss Graham Hill and four other team members) does a disservice to a driver tipped by many to be set for the very top. Stirring Formula Atlantic performances had prompted Frank Williams to give Brise his F1 break for the ill-fated Spanish GP at Montjuïc Park, where he was set for points until being hit by Tom Pryce.

Soon picked up by Hill to replace the injured Rolf Stommelen, Brise wasted no time, qualifying seventh for his maiden appearance with Hill at Zolder, then finishing sixth in his second outing at Anderstorp despite losing fifth gear. He outshone team-mate and future world champion Alan Jones, then returnee Stommelen, and had Mario Andretti beaten in a superb F5000 Long Beach cameo before being sidelined by a driveshaft failure.

Brise's self-confident manner meant he was often characterised as arrogant. But Williams never shared that view and, in David Tremayne's *Lost Generation* book, stated "he would have been an English great".

1983 Danny Sullivan

"I don't think I'd impressed enough to make somebody say, 'let's grab him,'" was Danny Sullivan's verdict on his sole F1 campaign with Tyrrell.

Over a decade after he'd been a team gopher as a young Jim Russell scholar, Sullivan had earned his shot having risen through the ranks in Europe and produced winning performances in Can-Am.

The DFV-powered Tyrrell 011 was in its third season of service, but still had enough life to win with Michele Alboreto in Detroit. Sullivan's peak was a more modest fifth at Monaco after taking slicks for the damp start, but he was second at the non-championship Brands Hatch Race of Champions.

Tyrrell's loss of Benetton backing to Toleman meant staying on was never an option as Sullivan instead headed to IndyCar and famously won the 1985 Indianapolis 500. Now a regular FIA steward, Sullivan believes he "could have won races" in F1, but a return wasn't on the cards: "Why am I going to leave something that I'm winning in to go struggle when you're 35 years old?"

1986 Johnny Dumfries

Ayrton Senna vetoing Team Lotus's hiring of Derek Warwick for 1986 left Johnny Dumfries in an unenviable position as second-choice number two. "Making his F1 debut in circumstances where the management of his team has lost the respect of everybody involved in motor racing," was James Hunt's typically forthright verdict in *Autosport*, and the affair cast a shadow that the 1984 British Formula 3 champion and ex-Ferrari tester struggled to escape.

His debut in Brazil set the tone. Dumfries was set for points until a misfire brought him in for unscheduled service; Senna's imminent arrival meant he was waved off for another lap with his Renault V6 stuttering before he was allowed back in for a belated cure. Ninth was scant reward.

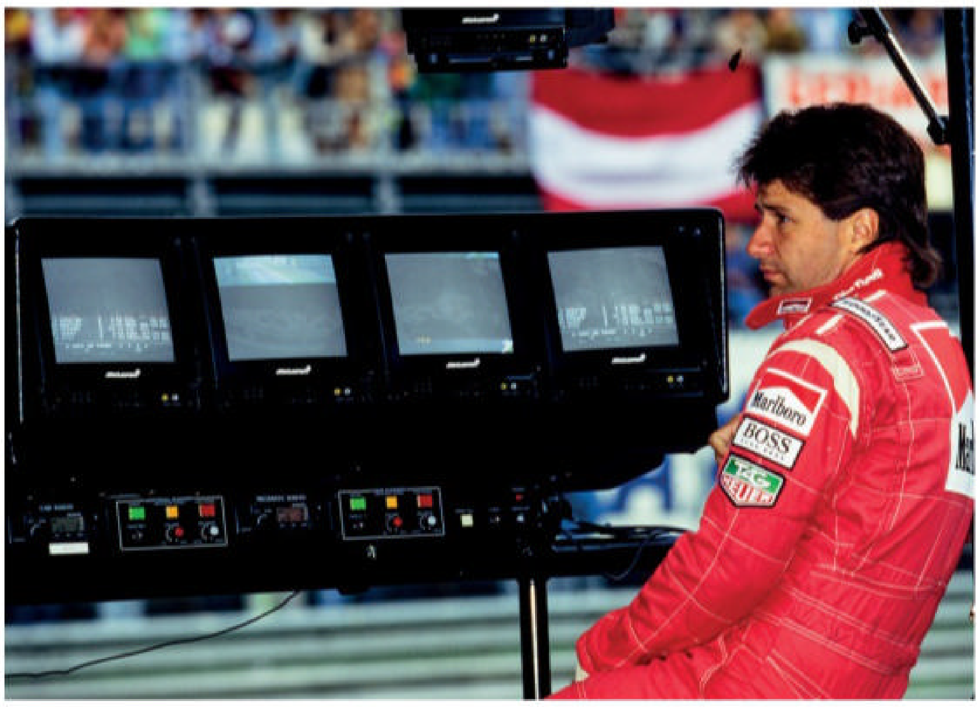
Confidence eroded by failure to qualify at Monaco after a practice shunt was exacerbated by a proliferation of mechanical dramas (more than once related to the fickle six-speed gearbox) which curtailed seven of his 15 starts. Tellingly, Dumfries's best finish of fifth came in Hungary – a new destination for all. The future Le Mans winner was jettisoned as Lotus signed Satoru Nakajima in 1987 to secure Honda engines.

1993 Michael Andretti

"I never wanted to give up. I never gave up. I never will give up." Unfinished business hinted at by Michael Andretti in a 1994 *Autosport* interview is likely a factor in his determined pursuit of a future F1 team entry. His first go was an unmitigated disaster as the 1991 Indycar champion walked away from McLaren after scoring his best result of 1993, third at Monza.

Andretti contests the often-propagated view that not living in Europe and commuting from the States demonstrated a lack of commitment, but what can be quantified is his on-track struggles. Ayrton Senna was always going to be tough to emulate on tracks Michael didn't know, but Andretti did himself no favours with a proliferation of incidents. He managed four racing laps from the opening three grands prix and even his Monza peak required others to hit trouble after an early spin dropped him to last.

The nadir was a run of six races qualifying outside the top 10 in an MP4/8 Senna took to five wins. Andretti's replacement, Mika Häkkinen, immediately showed what McLaren had missed, outqualifying Ayrton in Estoril. ▶



1995 Jean-Christophe Boullion

Joining Sauber four races into 1995 as Karl Wendlinger struggled to rediscover the spark he'd shown before his Monaco '94 shunt, Williams test driver Jean-Christophe Boullion found himself ushered out before the campaign's end for the very driver he'd replaced. Not until 2000 would a reigning F3000 champion be given an F1 shot the year after their coronation.

Boullion was completely overshadowed in his 13 grands prix by team-mate Heinz-Harald Frentzen and couldn't emulate the German by cracking the top 10 in qualifying. Both his points finishes – peaking with fifth at Hockenheim – came in races of attrition, although Boullion earned credit at Monza (where he took sixth) and the Hungaroring (10th after struggling with cramp) for plugging away in the spare prepped for Frentzen.

In mitigation, Sauber's C14 was powered by a Ford V8 engine that was heavier, longer and had to be mounted higher than the Mercedes the car had been designed for – which upset the weight distribution and handling. But Sauber evidently shared *Autosport's* verdict that Boullion had proven "a consummate disappointment".

2002 Allan McNish

He arrived in F1 a decade after he should have done and exited prematurely. But Allan McNish has few regrets about his time at the brand-new Toyota team before he and team-mate Mika Salo were ejected at the end of 2002. The three-time Le Mans winner believes few combinations would have fared much better under the circumstances.

McNish had been on the fast-track to F1 with Marlboro backing and a McLaren test deal until momentum was wrecked by Lola's terrible 1991 F3000 chassis and a mystery virus the year after. The Scot therefore had to pay his dues in sportscars – including a 1999 Toyota cameo at Le Mans – and was 32 when his F1 chance finally came.

The TF02 was at least reliable after a year of testing, but Toyota was operationally inexperienced and struggled to combine racing with development. Aero was severely undercooked. The edgy car didn't respond well to set-up tweaks either, a point McNish took longer than veteran Salo to recognise. McNish also believes Salo's debut point after a first corner pile-up in Australia unrealistically raised expectations.

Formula 1's loss proved sportscar racing's gain...

2003 Justin Wilson

Many expected Justin Wilson to be effectively excluded from F1 by his 6ft3in frame, but it was a disappointing five-race stint at Jaguar in 2003 that curtailed his dreams. The 2001 F3000 champion caught the eye in the first half of the year with Minardi, as superb opening laps became a trademark, and jumped at what on paper appeared to be promotion to a team solidly in the midfield when Jaguar ditched Antonio Pizzonia.

But Wilson's gamble in learning a new car, team and tyre supplier – Jaguar used Michelin, Minardi Bridgestone – ultimately backfired. He struggled to get close to team-mate Mark Webber and lacked mileage thanks to early exits from Hockenheim and Monza. A point for eighth at Indianapolis brought hope, but it didn't help that Wilson had to face questions about his future as early as Hungary when corporate politics wrought havoc in the boardroom. Losing sixth in the constructors' standings to Sauber by a single point, combined with Red Bull offering a £9m sponsorship package for Christian Klien, meant Wilson headed Stateside for 2004 and never found a way back in. ▶

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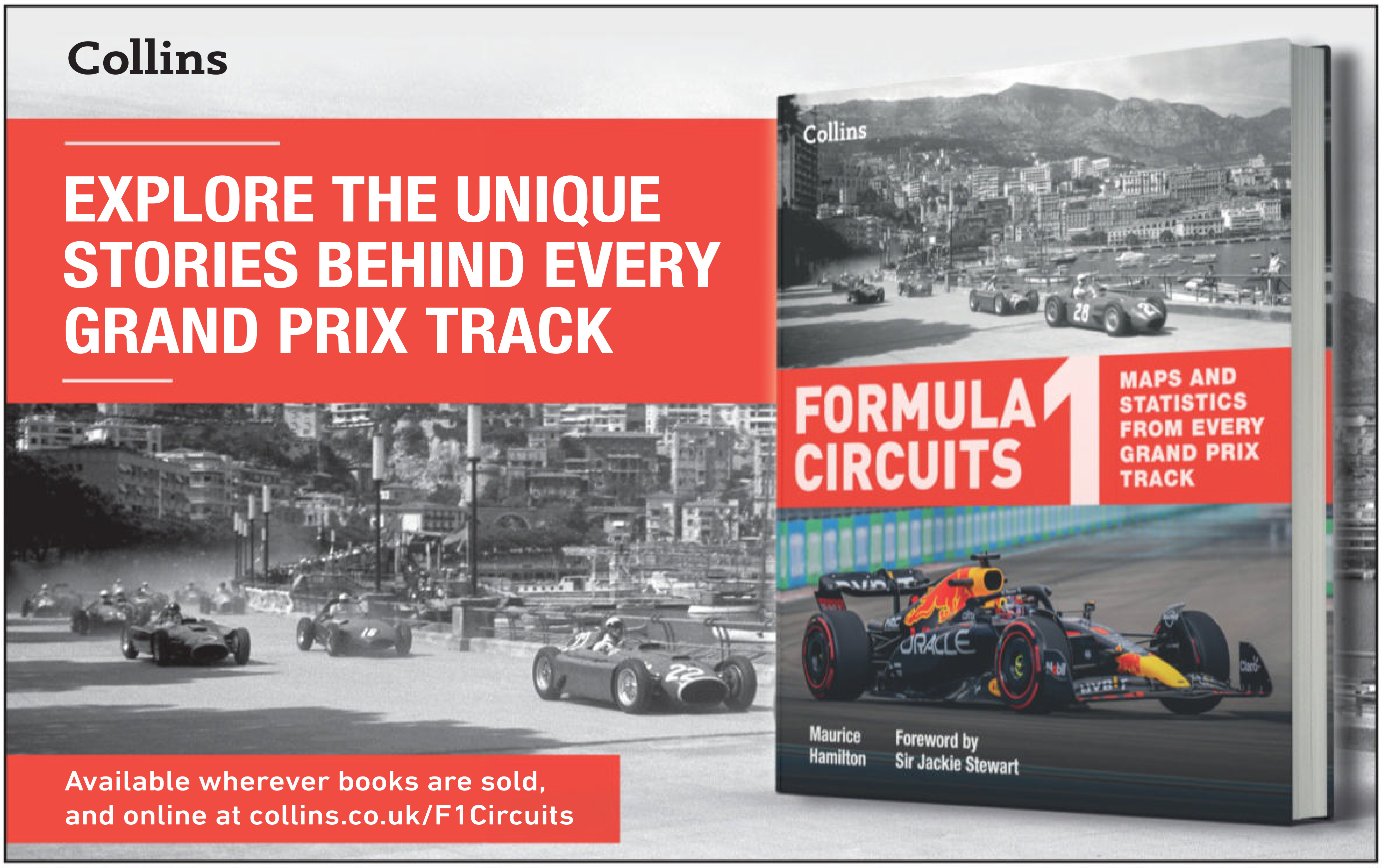

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Maurice Hamilton
Foreword by Sir Jackie Stewart

2010 Lucas di Grassi

The arrival of three new teams for 2010 facilitated the debut of 2007 GP2 runner-up Lucas di Grassi. But the future Formula E champion's season was destined to be one of toil given his Virgin-Cosworth VR01's deficiencies. The first F1 car designed entirely using CFD, its detailing was risibly poor; among other shortcomings, the fuel tank was too small. "The car had a lot of flaws," he tells *GP Racing* with some understatement.

Di Grassi reckons his weight gave him a disadvantage of three-tenths of a second per lap to team-mate Timo Glock. This, combined with the ex-Toyota driver's previous F1 experience, meant Glock got any upgrades first.

His one-year deal was not renewed, but di Grassi says his huge sighting-lap crash at Suzuka – where he'd outqualified Glock in the wet, but was caught out by an incorrect ride height setting on his first attempt at 130R with full tanks in the dry – had no bearing on the call since Jérôme d'Ambrosio was already lined up for 2011. Becoming Pirelli's tester was a dead-end for further F1 opportunities but Lucas proved his technical competency to Audi, who hired him as an LMP1 racer.

2013 Giedo van der Garde

One of the most peculiar contractual sagas of recent times meant Giedo van der Garde didn't get a second crack at the whip after his 2013 rookie season at tail-ender Caterham.

The 2008 Formula Renault 3.5 champion had plugged away for four more seasons of GP2 before an F1 seat became available, and he fared well alongside sophomore Charles Pic. Eye-catching qualifying performances to reach Q2 in Monaco and at Spa were the high points as he won over the team's engineers to change setup direction, one even Pic followed.

Believing his best chance of moving up the grid lay in taking a step back to a test role with a team which had better prospects, the Dutchman agreed a deal with Sauber for 2014. The situation then got messy. Believing he had done a deal to race in '15, van der Garde was surprised when Sauber announced Marcus Ericsson and Felipe Nasr.

The drama played out in public at the season-opener in Australia, where a court ruled he had a valid contract and came close to impounding Sauber's cars. Van der Garde later reached a private settlement. Now a fixture in endurance racing, he tells *GP Racing* it was "the most difficult time ever in my life".

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RACE DEBRIEF

F1 WORLD CHAMPIONSHIP ROUND 7

THE MONACO GP IN 5 KEY MOMENTS

Verstappen had to work harder than he has all season for victory in Monaco, but win he did, for the fourth time in six races

Monaco meant more joy for Aston Martin and Alonso with a first second-place finish of the year, but it could have been so much better

Verstappen's switch to intermediates came the lap after Alonso had swapped to mediums. Both decisions, at the time, were risky...

1 Verstappen snatches pole and victory from Alonso

As it produced a sixth win out of a possible six for Red Bull and the fourth of the year for himself, it's easy to undervalue Max Verstappen's performance in Monaco – so dominant has Red Bull been in the spring of 2023. But Max's 27-second-plus lead at the end of the race tells you very little about how challenging his path to victory in Monte Carlo really was.

On paper, Monaco represented the best chance for Red Bull's closest rival this year: Aston Martin's AMR23, in the hands of Fernando Alonso, has excelled under braking and in low-speed traction sections at most tracks since the start of the season, exactly what's needed in Monaco.

And, it turned out, Fernando did indeed get a lot closer to Max – especially in the qualifying session on Saturday – than he has been so far this year. But in the end it just wasn't enough.

The battle for pole position was as close as it gets. With less than a minute to go in Q3, Alonso grabbed provisional pole from Charles Leclerc, beating the Ferrari's lap by 0.022s. Verstappen was fifth at the time, and his final attempt didn't look particularly brilliant at first: although he had just beaten his personal best in the first two sectors of the track, Max was still 0.204s slower than Alonso entering the swimming pool section.

Verstappen then produced what Red Bull team boss Christian Horner described as an "unbelievable" final sector. Touching the walls twice, Max was 0.288s quicker than his Aston Martin rival in the final third of the track to prevail in the most important qualifying session of the year.

Since the run to the first corner is one of the shortest on the calendar, the Aston camp decided not to bet on the start of the race, opting instead to try to outfox Red Bull with strategy. Alonso put on hard tyres for his first stint on Sunday, as opposed to Verstappen's mediums, and – in slightly different circumstances – Fernando and his team could have been rewarded for their decision to play the long game.

A few laps in, it became clear to the teams that the risk of rain in the second half of the race was increasing. Verstappen therefore had to extend his first stint, making it, as he revealed after the finish, almost twice as long as originally planned – to avoid having to stop twice, first for slicks of a different compound and then for intermediates or wets in the event of rain. Alonso couldn't keep up with Max's pace, but was still just over 10

PICTURES: GLENN DUNBAR; ZAK MAUGER MARK SUTTON;SIMON GALLOWAY

seconds behind him at the key point of the race: when rain began as a mere sprinkle on lap 52 of 78, moistening the section of the track from Mirabeau to the entrance of the tunnel.

On lap 54, however, Aston made what hindsight would describe as a mistake but, given what was known at the time, appeared to be a reasonable call. With most of the track (or "99%" of it, according to Alonso himself) still dry, Fernando was called in for a fresh set of medium tyres – but, against expectations, the rain quickly intensified and spread. Alonso had to pit again a lap later, but fortunately for him the gap to the rest of the field remained large enough for him to keep second.

Usually there is a crossover point where intermediates become faster than slicks but that wasn't the case for the first couple of laps after the rain began: it was so localised that slicks were faster over the rest of the lap, but from Mirabeau to Portier it was a question of survival. Whether he could have taken the lead had Aston Martin risked an immediate switch to intermediates is difficult to say. Team boss Mike Krack revealed that simulation figures suggested the Spaniard would've moved ahead of Verstappen after the latter's subsequent pit stop, but it's still impossible to say whether Max himself could have pushed harder had he known Alonso had switched to inters.

Max, for his part, almost handed victory to his rival all by himself by kissing the barrier on the outside of the entrance to Portier while tiptoeing around a damp track on hard-worn mediums. But that proved to be his last real scare of the afternoon. He pitted for a tyre change on lap 55 and then brought the car home safely to claim his second Monaco victory in three years.

2 Ocon cheers under-pressure Alpine

Looking at Alonso's performances so far this year, it is easy to imagine Alpine bosses being even more aggrieved at their own indolence last summer, when they missed out on the chance to extend Fernando's contract. But Esteban Ocon's performance in Monaco must have helped distract them from any such reflections.

It would have been a stretch to say Alpine had the third-quickest car in Monte Carlo, but Ocon made the most of the opportunities presented by rivals. His final attempt in qualifying could hardly have been any better, as Esteban briefly put Alpine at the top of the standings just moments before the end of the session. He ended up fourth, partly thanks to the earlier crash of Sergio Pérez, who surely had the car to book his place on the first two rows of the grid – but to be just 0.188s slower than Verstappen and beat Carlos Sainz and both Mercedes drivers in Q3 was impressive enough.

Ocon was then promoted to third thanks to Ferrari. At the end of Q3, Charles Leclerc's engineer forgot to give his driver enough warning to give way to Lando Norris and the Briton almost hit the back of the SF-23 in the tunnel. The encounter resulted in a three-place grid penalty for the local hero.

It would have been difficult for Ocon to do any better in Sunday's race either. After a good start, he kept Sainz at bay until his first pitstop on lap 33. Alpine's strategy engineers didn't fall for Ferrari's repeated attempts to lure him into the pits prematurely – although sending mechanics into the pitlane and making dummy radio calls to Carlos to "box to overtake Ocon" was more of a spectacle worthy of an amateur dramatics group than a serious concern for Alpine's men.

Ferrari then helped again, this time by calling Sainz in earlier than expected, despite the fact that Carlos, unlike Ocon, had started on hard tyres and would easily have been able to extend his stint. In spite of Ocon's relatively slow 4.2s stop, Sainz not only remained behind, but was left frustrated by Ferrari's call. The team argued that it was trying to prevent an undercut from Lewis Hamilton, who had pitted a lap earlier than Ocon, but that didn't stop Sainz calling his strategists' decision "weak".

The biggest threat of losing the podium came after rain started to fall. Having qualified eighth, George Russell seized the perfect moment to change from his starting set of hards to intermediates and got out in a net third position, ahead of Esteban, after his only stop – but lost the place half a lap later thanks to a mistake at Mirabeau. All Ocon had to do from then on was keep Hamilton behind him and, although the seven-time world champion was the fastest man on the track at one point, Ocon's final stint was as flawless as his entire weekend. It was a timely result for a team which still had Alpine CEO Laurent Rossi's public excoriation ringing in its ears. ▶

ROLEX
ROLEX

After a superb qualifying performance Ocon dealt with the threats posed by Mercedes to claim his, and Alpine's, first podium of 2023

RACE DEBRIEF

F1 WORLD CHAMPIONSHIP ROUND 7

3 Pérez complicates his title challenge

It's hard to say how many people actually thought before Monaco that Sergio Pérez would really challenge Max Verstappen for the title this year. But at least there were reasons to believe: the wins in Jeddah and Baku came with a bit of luck, but Checo still very much had to earn them under pressure from Verstappen.

In any case, the number of such believers – assuming there were some – must have dwindled dramatically after the Monte Carlo weekend. Not only because Checo's deficit to his team-mate increased to 39 points, but also because the fault for that lies squarely with him.

Pérez ruined his weekend very early on in qualifying, slamming the RB19 into the wall at the exit of Sainte Devote on only his second flying lap. Two massive Q1 mistakes in just six rounds of the championship is an unacceptable number for someone who claims to be a title contender. And while in Melbourne he blamed his off into the gravel on some brake-related issues, in Monaco there were no excuses.

"I can't believe what I've done," he lamented after the crash, which not only took him out of Q1 but also left him last on the grid. "It caught me by surprise, just getting the rear out of shape, especially really late into the corner. It's a way of how we were trying to get the lap time out of it, but I just went over the limit."

Why Pérez decided to test where that limit was right at the start of qualifying, while driving the best car on the grid, is a question he probably doesn't know the answer to himself.

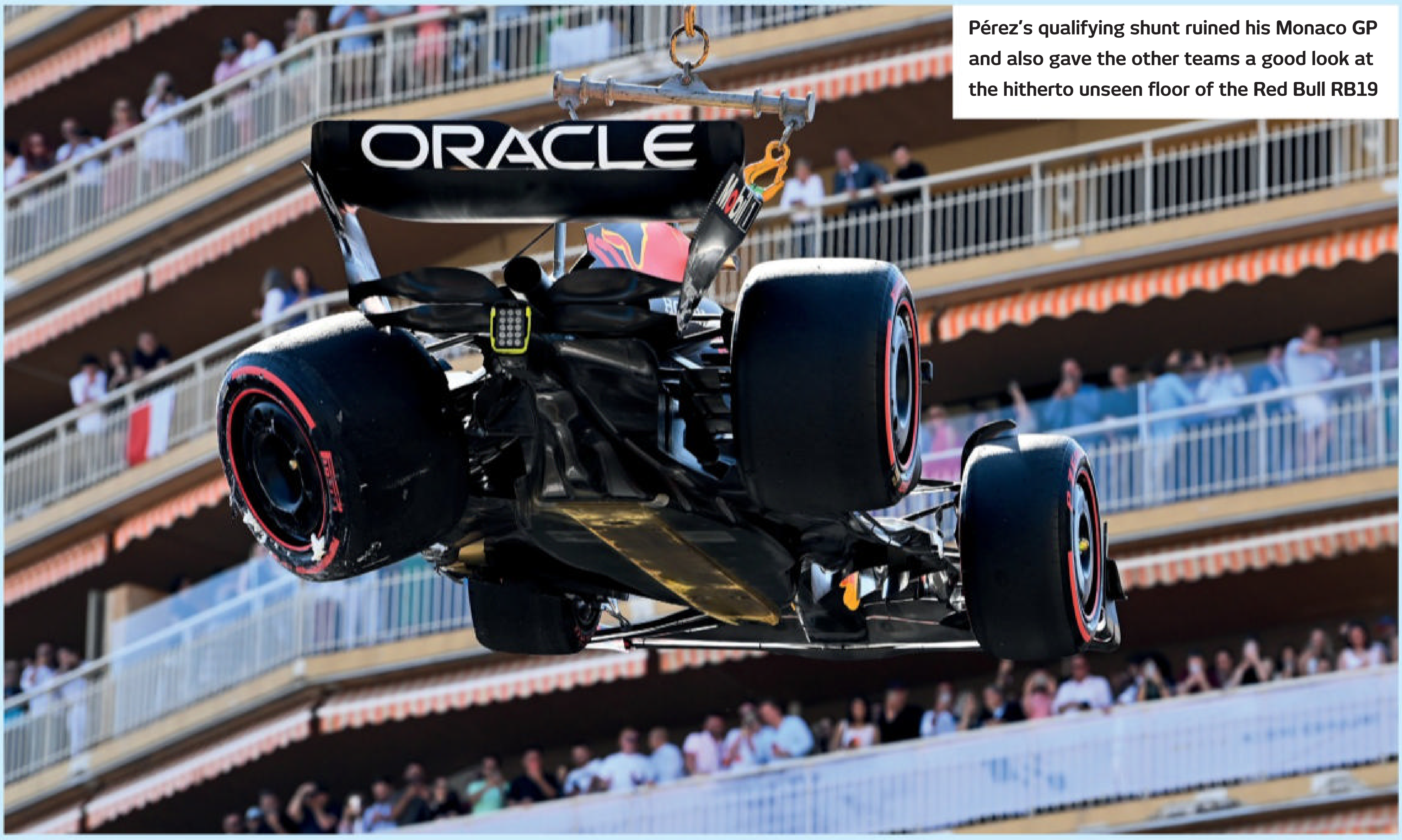
The team did its best to help Pérez to salvage at least a couple of points by opting for an aggressive strategy on Sunday. Sergio pitted for a new set of hard tyres after the first lap, but got stuck in traffic and couldn't make his way through fast enough to be in contention for a top-10 finish. He later crashed into the back of Kevin Magnussen's Haas, damaging his front wing and incurring another pitstop, and brushed the wall near the swimming pool on a damp track, finishing 17th in the end.

4 Mercedes improves from "awful" to "not good"

The Monaco GP marked the first appearance of the revised Mercedes W14 as the Brackley team finally abandoned its adventurous but ill-fated zero-sidepod concept. As well as more conventional sidepods, the car also received completely new front suspension, with the forward upper wishbone mounted noticeably higher than before.

The upgrade was going to be introduced a week earlier at Imola, but the flooding in northern Italy, which led to the cancellation of the Emilia Romagna Grand Prix, meant the first trial had to be moved to Monaco. And although the narrow street track in the Principality was probably the worst possible venue for this debut, the team had some cause for optimism at the end of the weekend.

The qualifying result was a repeat of Mercedes' performance in Monaco last year, as Lewis Hamilton and George Russell finished sixth and eighth respectively, but the gap to the front was halved.



Pérez's qualifying shunt ruined his Monaco GP and also gave the other teams a good look at the hitherto unseen floor of the Red Bull RB19

PICTURES: STEVEN TEE; MARK SUTTON; ANDY HONE; GLENN DUNBAR

It was difficult to gauge how the W14 upgrades performed but there were signs for optimism

Lewis's best attempt was just 0.360s slower than Verstappen's, compared with the 0.736s George (who was the better-placed Mercedes driver in 2022) had lost to pole-sitter Leclerc last year.

The fourth- and fifth-place finishes for Mercedes in the race were greatly helped by Ferrari's misfortunes and partly by the rain, which had even given Russell a chance of a podium finish. But even with all these caveats, the first outing for the updated W14 can be considered a success of sorts.

"It's so difficult [to assess the performance of the car] because we were in the mix with Aston Martin and Ferrari," said Merc boss Toto Wolff. "On a positive note, it may be encouraging because we have never been really good here. The car was awful last year and this time round the drivers said it's 'not good'. So, there's a step in the description."

5 Stroll's second pointless weekend in a row

Only Lance Stroll can challenge Sergio Pérez for the dubious honour of recording the worst performance of the Monaco weekend. Stroll again failed to score any points for his father's team.

As with Pérez, Stroll's weekend went off the rails in qualifying. Unlike Checo, though, Lance avoided crashing into the barriers, but had little excuse for not making it into Q3. Not being able to prepare his tyres for the first run in Q2 due to traffic and being delayed at the weighbridge is hardly mitigation for a driver in F1's current second-best team.

And while running over debris created by Lando Norris' crash and losing time on the final run due to the damage to the floor was also a contributor, Stroll should have made the final segment anyway.

Starting from 14th, Lance still had a chance to score some points, but his first-lap attempt to pass Logan Sargeant on the outside of the hairpin meant damage to the car and a loss of several positions. Although Stroll eventually switched straight to intermediate tyres as the rain started, his chances of scoring points were already gone.

A retirement was the logical conclusion to the weekend. A suspected brake problem was making life difficult for him even before the rain and, on a wet track, Stroll was unable to avoid multiple contacts with the barriers and therefore a DNF.

Consecutive weekends without points for Lance have suddenly left Aston vulnerable in the championship, as Mercedes – despite another podium for Alonso – closed the gap to one point.

Another weekend to forget for Lance Stroll as he failed to back up Alonso's second place

RESULTS ROUND 7

CIRCUIT DE MONACO / 28.05.23 / 78 LAPS

1st	**Max Verstappen** Red Bull	1h48m51.980s
2nd	**Fernando Alonso** Aston Martin	+27.921s
3rd	**Esteban Ocon** Alpine	+36.990s
4th	**Lewis Hamilton** Mercedes	+39.062s
5th	**George Russell** Mercedes	+56.284s*
6th	**Charles Leclerc** Ferrari	+61.890s
7th	**Pierre Gasly** Alpine	+62.362s
8th	**Carlos Sainz** Ferrari	+63.391s
9th	**Lando Norris** McLaren	+1 lap
10th	**Oscar Piastri** McLaren	+1 lap
11th	**Valtteri Bottas** Alfa Romeo	+1 lap
12th	**Nyck De Vries** AlphaTauri	+1 lap
13th	**Zhou Guanyu** Alfa Romeo	+1 lap
14th	**Alex Albon** Williams	+1 lap
15th	**Yuki Tsunoda** AlphaTauri	+2 laps
16th	**Sergio Pérez** Red Bull	+2 laps
17th	**Nico Hülkenberg** Haas	+2 laps**
18th	**Logan Sargeant** Williams	+2 laps***

Retirements

Kevin Magnussen Haas	70 laps - damage
Lance Stroll Aston Martin	53 laps - brakes/damage

Fastest lap

Lewis Hamilton 1m15.650s on lap 33

*includes 5s penalty for rejoining the track unsafely **includes 10s penalty for failing to serve a penalty during a pitstop ***includes 5s penalty for speeding in the pitlane

TYRE COMPOUNDS USED

Hard (C3) **Medium** (C4) **Soft** (C5) **Inter** **Wet**

CLIMATE	AIR TEMP	TRACK TEMP
Sunny/ wet	28°C	43°C

DRIVERS' STANDINGS

1	Verstappen	144pts	11	Norris	12pts
2	Pérez	105pts	12	Hülkenberg	6pts
3	Alonso	93pts	13	Piastri	5pts
4	Hamilton	69pts	14	Bottas	4pts
5	Russell	50pts	15	Guanyu	2pts
6	Sainz	48pts	16	Tsunoda	2pts
7	Leclerc	42pts	17	Magnussen	2pts
8	Stroll	27pts	18	Albon	1pt
9	Ocon	21pts	19	De Vries	0pts
10	Gasly	14pts	20	Sargeant	0pts

motorsport STATS

RACE DEBRIEF

F1 WORLD CHAMPIONSHIP ROUND 8

THE SPANISH GP IN 5 KEY MOMENTS

Lewis Hamilton's second in Spain clearly suggested that the upgrades to the Mercedes W14 are a step in the right direction

Russell's third gave Mercedes its first double podium of 2023 and the team also moved ahead of Aston in the constructors' championship

Another race and yet another Red Bull win. Verstappen wasn't at his best around Barcelona but the result was still the same

1 Mercedes best-of-the-rest behind dominant Verstappen

Max Verstappen wasn't at his imperious best despite winning the Spanish Grand Prix from pole position with a 24.09s margin over second place, but such is Red Bull's superiority that the world champion can still have a (slightly) off day and emerge on top. A typically robust defence of his lead from the challenge of Ferrari's Carlos Sainz into Turn 1 will have raised the hackles of some in the fan community, but it was a succession of track-limits violations while running well ahead later in the race which attracted the attention of the stewards.

Max qualified nearly half a second faster than Sainz, his companion on the front row, and was on course to go even faster on his second Q3 run when race engineer Gianpiero Lambiase signalled him to abort the lap in case that set of softs were required on Sunday. At this point Red Bull was still worried about the possibility of a three-stop race, particularly since Verstappen was flying solo once again up front – team-mate Sergio Pérez checked out of qualifying early after skittering through the gravel, and would start 11th.

Though rain played a part in shaping the grid – the track was 'green' and many of the kerbs still damp after a Saturday-morning deluge – it remained merely a threat on race day. Both Red Bulls started on medium-compound Pirellis and, if this was to be expected for Pérez, giving him the freedom to pick up track position by delaying his first stop, for Max this was a clear sign Red Bull still didn't expect it to be an easy win from pole. With the rest of the top 10 on softs it was a typically physical run-in to Turn 1 at the start, as Max brusquely cut off Sainz's challenge around the outside and McLaren's Lando Norris, an outlier in third place, positioned himself poorly into Turn 2 and lost a chunk of his front wing to the back of Lewis Hamilton's Mercedes.

Although Lance Stroll passed Hamilton for third later on the first lap as Norris limped back to the pits, Lewis quickly relieved him of that position once DRS was enabled and began to home in on Sainz. George Russell was also making progress in the second Mercedes after an unimpressive qualifying in which he collided with his team-mate and struggled throughout after making a pre-session setup change which made the revised W14 worse rather than better. From 12th on the grid Russell immediately passed Pérez and Pierre Gasly, then found himself going three wide into

PICTURES: SAM BLOXHAM; MARK SUTTON; ANDY HONE; JAKE GRANT

Turn 1 with Nico Hülkenberg and Oscar Piastri, requiring him to take to the escape lane. George had the presence of mind to observe the correct exit via the bollards and escaped sanction for leaving the track and gaining an advantage. Having gained five places on the opening lap he got by Esteban Ocon's Alpine under DRS, then benefitted from others ahead struggling on the softs and pitting early.

Hamilton and Russell were able to push a little and keep their softs alive for longer – much longer – than nearby rivals, a crucial nine and 10 laps longer than Sainz, called in at the end of lap 15. Lewis emerged from his pitstop 2.3s down on the Ferrari but caught and passed Sainz at Turn 1 under DRS three laps later. Russell completed a similar move, albeit from further back, on lap 35.

But although Hamilton said the new-look W14 "felt great", and team boss Toto Wolff described the revised spec as setting "a new baseline" from which Mercedes can build developments, there's still a vast gap to the front. "They [Red Bull] are just far away," said Wolff, "and that is something only we have in our hands to get under control."

Leclerc had a nightmare Spanish GP, which started with a very weirdly handling car in qualifying and didn't really get any better

2 Ferrari still doesn't understand its car

Despite bringing a major upgrade to the SF-23, adopting a Red Bull-style sidepod profile, Ferrari again endured a bafflingly inconsistent weekend in which the car's performance varied substantially from stint to stint. According to Carlos Sainz the upgrade "definitely felt a step in the right direction" in medium-to-low-speed sections and he qualified second. But in the race he went backwards.

Team-mate Charles Leclerc, meanwhile, struggled to go forwards from a pitlane start after another qualifying fiasco. Leclerc was eliminated in Q1 and it wasn't the queasy weather conditions on Saturday which were to blame but a car which handled differently in left-hand corners to right-hand ones.

"I thought it was the tyres on the first set," he said, "but then we went on the second set, and the feeling was exactly the same. I just had no grip from the rears in the left-hand corners.

"I don't have the answer."

Neither, immediately, did Ferrari, owing to parc fermé resitrictions. That dictated a precautionary change of the entire rear end – suspension and gearbox – and therefore a pitlane start.

Despite running second early on, Sainz quickly became a fringe contender for the podium as Lewis Hamilton loomed in his mirrors before Ferrari called him in early for medium-compound Pirellis. Hamilton ran another nine laps on the same soft Pirellis before taking on mediums and blowing past easily. A late stint on the hards yielded no improvement and Sainz lost ground to Sergio Pérez as well as George Russell, finishing fifth.

"Honestly, I just spent the whole race managing tyres because we know we're very hard on them," said Sainz. "And with this high-degradation circuit, I just couldn't push.

"We know it's a weakness of our car and coming to a high-deg circuit and a two-stop race, we were just managing the whole way trying to make it to the target laps of the stints and still falling short in a few of them."

Leclerc spent several laps bottled up behind the AlphaTauri of Nyck de Vries early on, ultimately reaching the periphery of the top 10 but unable to pass Pierre Gasly's Alpine for 10th.

"I went from a first [stint on the] hard, to a second hard in the last stint, did the same thing and the car is behaving in a completely different way," he fumed. "I don't understand what we're doing wrong but we're doing something wrong."

"I think the main issue for us is not the potential on the lap, or this type of corner," said team principal Frédéric Vasseur. "The main issue is the consistency." ▶

Sainz qualified a superb second and briefly challenged Verstappen at the start, only to slip back to fifth as the race progressed

3 Soft-tyre performance consigns Aston Martin to the fringe

The Spanish GP was comfortably Aston Martin's least convincing race weekend of the season so far, though the embattled Lance Stroll will have at least drawn some succour from outqualifying Fernando Alonso at last. Stroll qualified sixth and started fifth after fourth-placed Pierre Gasly was penalised twice for impeding other drivers. Alonso couldn't delight his home fans after an excursion through the gravel at Turn 1 on his first Q1 lap damaged his car's underfloor, consigning him to a P8 start.

Stroll was aggressive on lap one, capitalising on Lando Norris's issues to pass the third-placed McLaren and Hamilton's Mercedes, but he fell back in the opening stint to an eventual sixth. Alonso also had a troubled first stint on the softs but fought back to claim seventh, despite the efforts of former team-mate Esteban Ocon to run him off the track as Fernando went by the Alpine on lap 51.

It was during a final stint on the hard tyre after two on softs where Fernando made progress, passing Zhou Guanyu and Yuki Tsunoda before making the decisive pass on Ocon.

"We didn't have the pace, so that's the biggest problem," said Alonso. "It wasn't that we were unlucky or on differing strategies or anything like that, I think we were slow compared with the Mercedes – slow on the soft, slow on the hard. We just concentrated on the Alpines, AlphaTauris, and kept up the pace with the Ferraris."

"I think at times we were five to six, or even seven-tenths slower [during the opening stint]," said team principal Mike Krack. "And this is something we need to understand. I think we were very strong at the end on the hard. But by then the damage was done. Although I think we should not call it damage. We finished with both cars high up and scored 14 points. So, it's not a drama at all."

4 McLaren still struggling despite Norris qualifying heroics

Lando Norris took a shock third place in qualifying at Barcelona but he was quick to put the result down to poor weather and the track's revised layout playing into McLaren's hands. The MCL60's strongest suit is in faster corners, where it benefitted from the removal of the widely reviled chicane; it's also faster to warm its tyres up than rivals, which enabled Norris to shine in the gloomy conditions of qualifying.

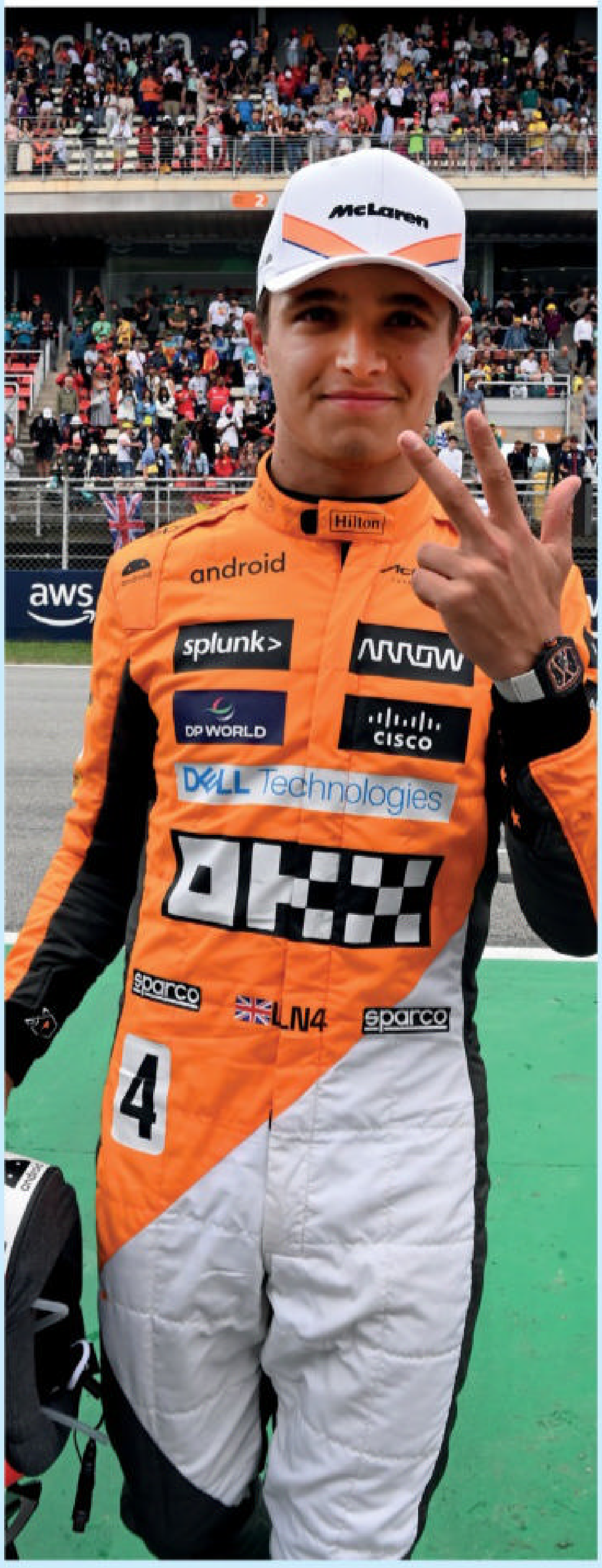
Lando was as surprised as anyone, having thought "it was going to be tough to get out of Q1". In the race, though, he was jumped by the fast-starting Hamilton – who rode Max Verstappen's slipstream effectively on the run to Turn 1 – then hit the back of Hamilton's car and lost a portion of his front wing. The resulting pitstop consigned him to the tail of the field. Not that he or the team were expecting a podium finish anyway.

"I did see in Turn 1 that Max went off the track,

Stroll Snr wishes son Lance good luck (left). After a good start Lance was passed by Hamilton (below) and dropped back to sixth

PICTURES: ZAK MAUGER; MARK SUTTON; ANDY HONE; JAKE GRANT

Norris, having thought he might struggle just to get out of Q1, qualified an amazing third



went a bit wide, so then he had to bounce over the kerb in Turn 2 and then everyone just checked up," explained Lando. "I was too close to Lewis to be able to react and brake and whatever. So just an unlucky moment.

"Yesterday was a special day. Some good teams struggled a lot and some of the worse teams did a better job, so it was just an odd day, people making a lot of mistakes and we just capitalised on that.

"There was the expectation that we would have had a very difficult day today. Our aim was to maybe finish in the points, but we weren't expecting anything like yesterday."

5 Guanyu outclasses Bottas in best weekend yet

In ninth place and flying slightly under the radar, Alfa Romeo's Zhou Guanyu put in arguably the most convincing performance of his F1 career so far. He was a crucial three-tenths faster in Q1 than veteran team-mate Valtteri Bottas, which enabled him to progress to Q2. From 13th on the grid he rose to ninth on the opening lap – passing Sergio Pérez's Red Bull in the process – then relieved Nico Hülkenberg of eighth.

This provided a solid platform for the rest of the race. Hülkenberg would not be a factor, since the Haas was too aggressive on its tyres, but Guanyu had to fight Yuki Tsunoda's AlphaTauri to secure ninth place at the chequered flag. Tsunoda, for his part, also drove a strong race for the most part but his defence against Guanyu was deemed too forceful. The resulting five-second penalty dropped him behind not only the Alfa, but also Pierre Gasly's Alpine and Charles Leclerc's Ferrari.

A furious Tsunoda then blasted the penalty as "ridiculous" and accused Guanyu of "pretending like he got forced out".

Spain was Guanyu's best showing in F1 as he comfortably out-qualified team-mate Bottas

RESULTS ROUND 8

CIRCUIT DE BARCELONA-CATALUNYA / 04.06.23 / 66 LAPS

1st	**Max Verstappen** Red Bull	1h27m57.940s
2nd	**Lewis Hamilton** Mercedes	+24.090s
3rd	**George Russell** Mercedes	+32.389s
4th	**Sergio Pérez** Red Bull	+35.812s
5th	**Carlos Sainz** Ferrari	+45.698s
6th	**Lance Stroll** Aston Martin	+63.320s
7th	**Fernando Alonso** Aston Martin	+64.127s
8th	**Esteban Ocon** Alpine	+69.242s
9th	**Zhou Guanyu** Alfa Romeo	+71.878s
10th	**Pierre Gasly** Alpine	+73.530s
11th	**Charles Leclerc** Ferrari	+74.419s
12th	**Yuki Tsunoda** AlphaTauri	+75.416s*
13th	**Oscar Piastri** McLaren	+1 lap
14th	**Nyck De Vries** AlphaTauri	+1 lap
15th	**Nico Hülkenberg** Haas	+1 lap
16th	**Alex Albon** Williams	+1 lap
17th	**Lando Norris** McLaren	+1 lap
18th	**Kevin Magnussen** Haas	+1 lap
19th	**Valtteri Bottas** Alfa Romeo	+1 lap
20th	**Logan Sargeant** Williams	+1 lap

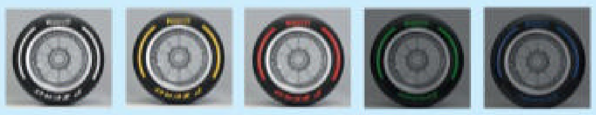
*includes 5s penalty for forcing another driver off the track

Retirements

Fastest lap

Max Verstappen 1m16.330s on lap 61

TYRE COMPOUNDS USED



Hard (C1) **Medium** (C2) **Soft** (C3) **Inter** **Wet**

CLIMATE	AIR TEMP	TRACK TEMP
Overcast	23°C	31°C

DRIVERS' STANDINGS

1 Verstappen	170pts	11 Norris	12pts
2 Pérez	117pts	12 Hülkenberg	6pts
3 Alonso	99pts	13 Piastri	5pts
4 Hamilton	87pts	14 Bottas	4pts
5 Russell	65pts	15 Guanyu	2pts
6 Sainz	58pts	16 Tsunoda	2pts
7 Leclerc	42pts	17 Magnussen	2pts
8 Stroll	35pts	18 Albon	1pt
9 Ocon	25pts	19 De Vries	0pts
10 Gasly	15pts	20 Sargeant	0pts

motorsport STATS

RACE PREVIEW

F1 WORLD CHAMPIONSHIP ROUND 10

AUSTRIAN GP

30 June-2 July 2023
Red Bull Ring

PICTURE: STEVEN TEE. ILLUSTRATION: ALAN ELDRIDGE

THE MAIN EVENT

Dutch fans turned Red Bull's home circuit orange in 2022, resulting in a party atmosphere rarely seen here since the days of Michael Schumacher's pomp. Last year some of the behaviour got out of hand, so it remains to be seen what precautions the promoter takes this year.

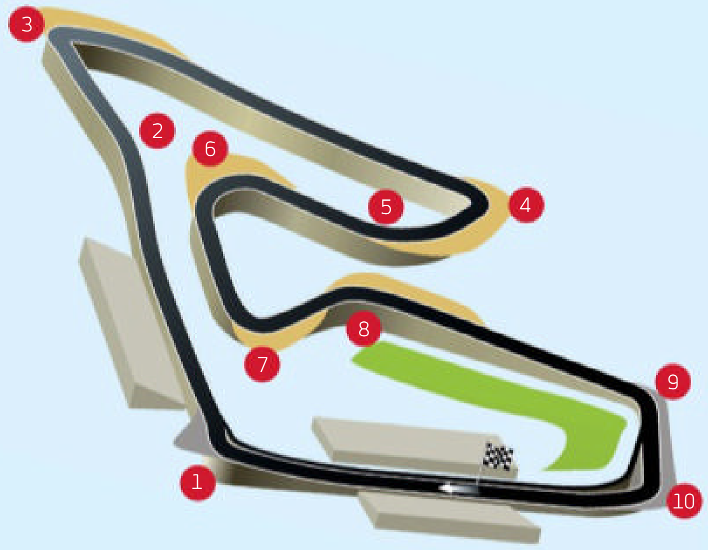
Despite a short lap and a supposedly unchallenging layout, the circuit has hosted plenty of exciting races thanks to the effects of weather and tyre degradation. It also has more than one overtaking opportunity per lap, owing to the ease of making mistakes at Turn 1. Getting it wrong there leaves drivers exposed on the straight which follows – and even if they win the battle at Turn 3 they might still be vulnerable at Turn 4.

2022 RACE RECAP

Max Verstappen won the sprint race from pole position with the Ferraris of Charles Leclerc and Carlos Sainz second and third. Sainz had got by Leclerc at the start but then went wide attacking Verstappen into Turn 3, enabling Charles to retake second place.

In the grand prix Verstappen led for 12 laps before Leclerc went by using DRS. Crucially, Max then pitted while Charles was able to circulate at a good pace for another 15 laps before stopping – then six laps later he went by again. The pattern repeated as they continued to pit out of sync with one another and Leclerc made what would be the decisive pass for the win on lap 53 of 71. Third place for Lewis Hamilton ended his weekend on a positive note after a costly spin in Q3.

KEY CORNER: TURN 1 A possible overtaking opportunity thanks to the DRS zone down the pit straight, but it is also a tricky corner to get right because of the sloping approach and camber change as well as the kerbs lurking at its extremities.



RACE DATA

Circuit Red Bull Ring
First GP 1970
Number of laps 71
Circuit length 2.683 miles
Race distance 190.420 miles
Lap record 1m05.619s
Carlos Sainz (2020)
F1 races held 37
Winners from pole 13
Pirelli compounds C3, C4, C5

CAR PERFORMANCE

Downforce level Low
Cooling requirement Medium
Full throttle 66%
Top speed 192mph
Average speed 140mph

TIMETABLE (UK TIME)

Friday 30 June
Practice 1 12:30-13:30
Qualifying 16:00-17:00
Saturday 1 July
Sprint shootout 11:00-11:44
Sprint 15:30-16:30
Sunday 2 July
Race 14:00
Live coverage Sky Sports F1
Highlights Channel 4

THE PAST FIVE WINNERS HERE

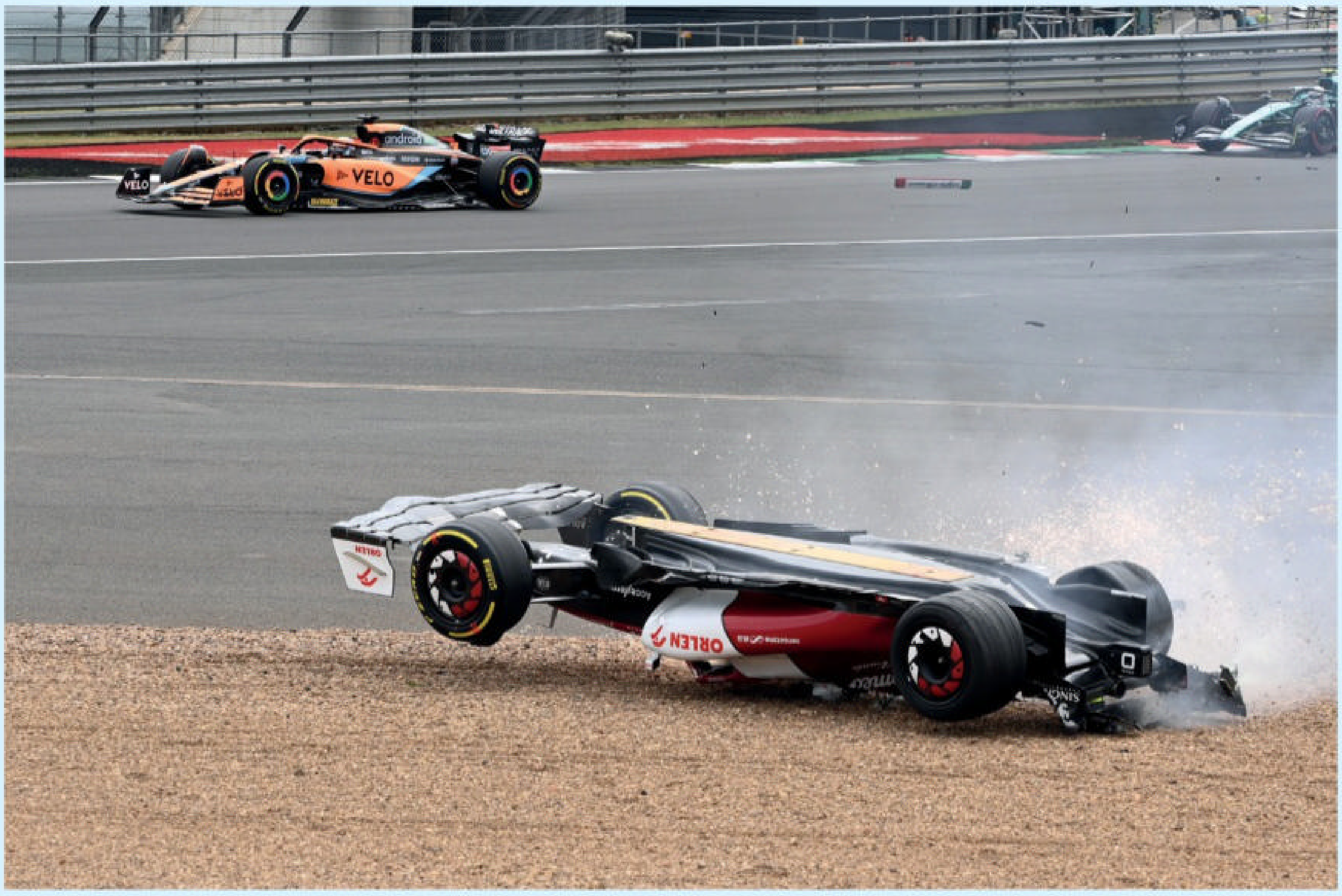
2022	2021	2021	2020	2020
Charles Leclerc	Max Verstappen	Max Verstappen	Lewis Hamilton	Valtteri Bottas
Ferrari	Red Bull	Red Bull	Mercedes	Mercedes

RACE PREVIEW

F1 WORLD CHAMPIONSHIP ROUND 11

BRITISH GP

7-9 July 2023
Silverstone



PICTURE: MARK SUTTON. ILLUSTRATION: ALAN ELDRIDGE

THE MAIN EVENT

If you're lucky enough to have tickets for this year's British GP then the action begins on Thursday 6 July with a launch party on site headlined by DJ Calvin Harris with Cat Burns and Jess Glynne in support. Over the following three nights Jax Jones, the Black Eyed Peas and Tom Grennan headline the main stage, so don't think of packing up until Monday…

There's also the small matter of the racing on one of the fastest, most exciting circuits on the calendar. This year Silverstone has added more seats to offset the area now occupied by the new Escapade complex. Another 'must' is the Silverstone Museum where the track's past meets its future – including a cutting-edge sim racing rig.

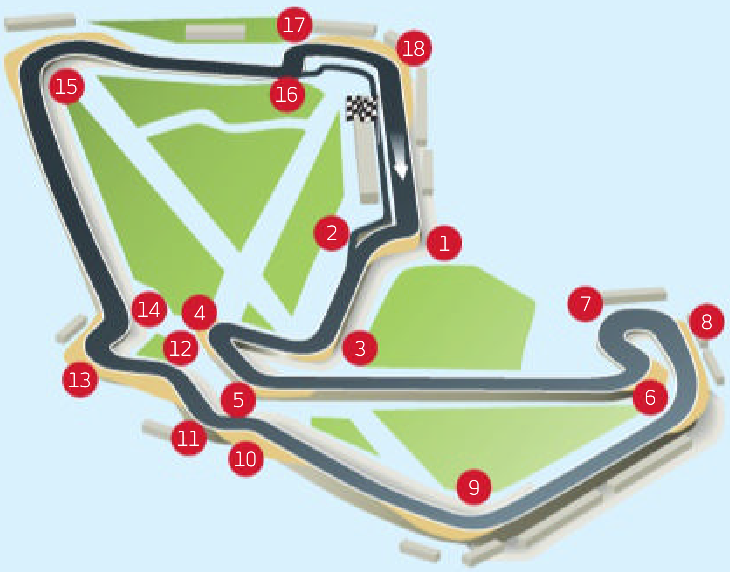
2022 RACE RECAP

It was a weekend of firsts for Ferrari's Carlos Sainz as he claimed his maiden pole and victory. But the race got off to an unfortunate start as George Russell and Pierre Gasly tangled, spinning Russell's Mercedes into the side of Zhou Guanyu's Alfa Romeo – which then flipped and rolled over a tyre barrier. The race was red-flagged, just as – to add to the confusion – a group of Just Stop Oil campaigners attempted a sit-down protest on the Wellington Straight.

When the race got under way again Verstappen seized the lead, only to run over debris which damaged his floor. Mistaking the symptoms for a puncture he pitted. During a late Safety Car Ferrari made a strange strategy call, pitting Sainz but leaving Leclerc out, which gave Charles track position but no means to defend it. When the race went green again Sainz, Hamilton and Sergio Pérez surged past.

KEY CORNER: TURN 7

An under-appreciated gem, Luffield is a right-hand loop where drivers have to balance their wish not to stress the outside-front tyre with the need to get a good exit for the straight which follows.



RACE DATA

Circuit Silverstone Grand Prix Circuit
First GP 1950
Number of laps 52
Circuit length 3.66 miles
Race distance 190.262 miles
Lap record 1m27.097s Max Verstappen (2020)
F1 races held 57
Winners from pole 21
Pirelli compounds C1, C2, C3

CAR PERFORMANCE

Downforce level High
Cooling requirement Medium
Full throttle 66%
Top speed 199mph
Average speed 153mph

TIMETABLE (UK TIME)

Friday 7 July
Practice 1 12:30-13:30
Practice 2 16:00-17:00
Saturday 8 July
Practice 3 11:30-12:30
Qualifying 15:00-16:00
Sunday 9 July
Race 15:00
Live coverage Sky Sports F1 and Channel 4

THE PAST FIVE WINNERS HERE

2022	2021	2020	2020	2019
Carlos Sainz Ferrari	Lewis Hamilton Mercedes	Max Verstappen Red Bull	Lewis Hamilton Mercedes	Lewis Hamilton Mercedes

RACE PREVIEW

F1 WORLD CHAMPIONSHIP ROUND 12

HUNGARIAN GP

21-23 July 2023
Hungaroring

PICTURE: GLENN DUNBAR. ILLUSTRATION: ALAN ELDRIDGE

THE MAIN EVENT

Judicious layout tweaks, DRS and the sensitivity of the Pirelli tyres have helped transform the competitive picture at a circuit once notorious for processional racing. Hungary was a race many F1 insiders were inclined to skip but this is no longer the case, even though the Hungaroring could do with freshening up. The opening of the Balaton Park Circuit elsewhere in Hungary may provide competition and persuade the accountants to sharpen their pencils…

This event is a great one to visit since you can enjoy nearby Budapest, a great city – albeit one with some eccentricities. As a contributor to *GP Racing*'s sister title *Autosport* learned to their cost, parking your car pointing the wrong way on some streets is a clampable offence…

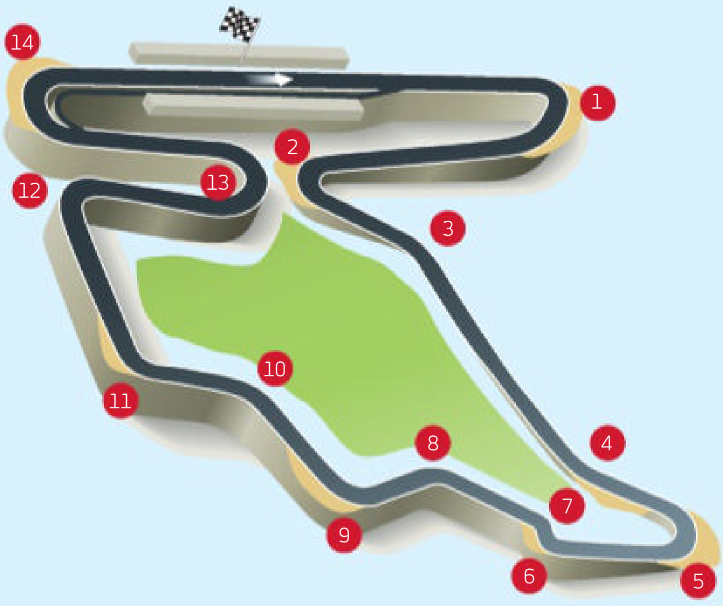
2022 RACE RECAP

George Russell took the first pole position of his F1 career, ahead of the Ferraris of Carlos Sainz and Charles Leclerc, while Max Verstappen looked to have a struggle on his hands after locking up at Turn 2 on his first Q3 lap and then being forced to abort his second run by a power unit glitch. Starting 10th, though, proved little obstacle to Max as he scythed through the field on race day.

Leclerc looked set for good result as he capitalised on slow stops for Russell and Sainz to grab the lead, but Verstappen was picking off cars under DRS and closing in. When Ferrari inexplicably put Leclerc on the obviously slower hard tyre Max was able to overtake him twice – the second time required after Verstappen spun exiting Turn 13. A later stop for softs consigned Charles to sixth.

KEY CORNER: TURN 1

The extension of Turn 1 combined with the reprofiling of Turn 2 means there are a number of possible approaches to the first corner, sometimes rewarding those who chance it and brake deep.



RACE DATA

Circuit Hungaroring
First GP 1986
Number of laps 70
Circuit length 2.722 miles
Race distance 190.53 miles
Lap record 1m16.627s
Lewis Hamilton (2020)
F1 races held 37
Winners from pole 16
Pirelli compounds TBA

CAR PERFORMANCE

Downforce level High
Cooling requirement High
Full throttle 55%
Top speed 193mph
Average speed 123mph

TIMETABLE (UK TIME)

Friday 21 July
Practice 1 12:30-13:30
Practice 2 16:00-17:00
Saturday 22 July
Practice 3 11:30-12:30
Qualifying 15:00-16:00
Sunday 23 July
Race 14:00
Live coverage Sky Sports F1
Highlights Channel 4

THE PAST FIVE WINNERS HERE

2022	2021	2020	2019	2018
Max Verstappen Red Bull	Esteban Ocon Alpine	Lewis Hamilton Mercedes	Lewis Hamilton Mercedes	Lewis Hamilton Mercedes

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MIDNIGHT RUN TO PARIS

THURSDAY TO SUNDAY | 13–16 JULY

A mad-cap 3-night Bastille Day weekend that includes a midnight blast around the Arc de Triomphe, Flaming Ferrari cocktails at the Hoxton, lunch and pétanque in the Tuileries Gardens, a private river cruise for dinner and the Bastille Day fireworks, and a scenic drive through the countryside to Le Touquet for a final night of partying.

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TO PARIS
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orientwatch.co.uk

Established in 1951, the Orient Star brand is now part of the Seiko Epson Corporation. In 2021 it launched a new generation of Skeleton watches in its Classic Collection, 'skeletonisation' in watchmaking being a style in which the designers bring the mechanical aesthetics of the mechanism to the fore, exposing the workings within. Orient Star's new Contemporary Collection aims for a "refined yet informal" look with fine hairline and mirror finishing on a slimline 39mm diameter stainless steel casing.

The hand-wound F8B61 movement is presented in contemporary grey with the silicon escape wheel in blue, and the balance wheel bridge evoking the shape of a comet – all symbolising "the vastness of the universe", says Orient Star. The power reserve is claimed to be 70 hours.

50 YEARS WITH FERRARIS

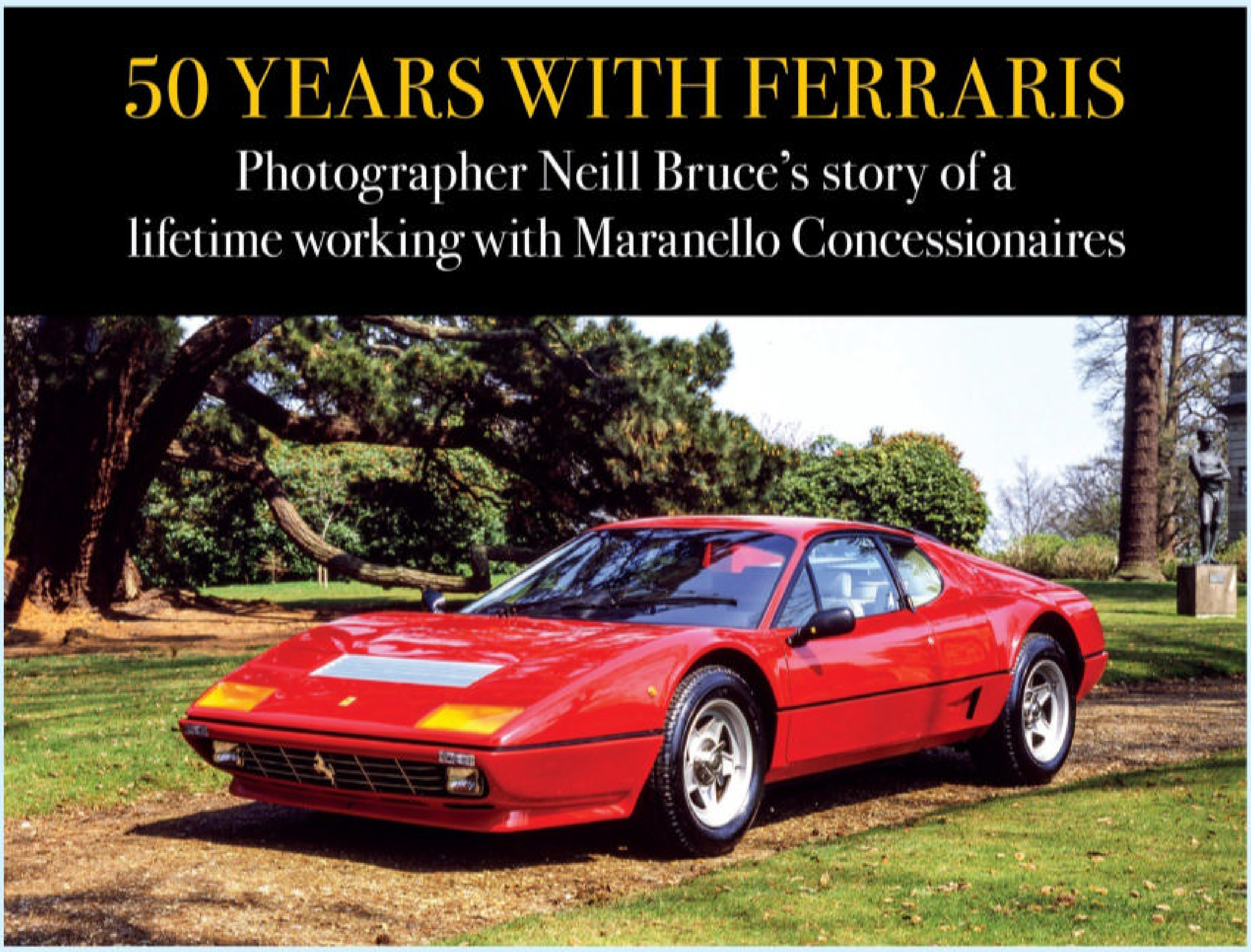
Author Neill Bruce

Price £45

evropublishing.com

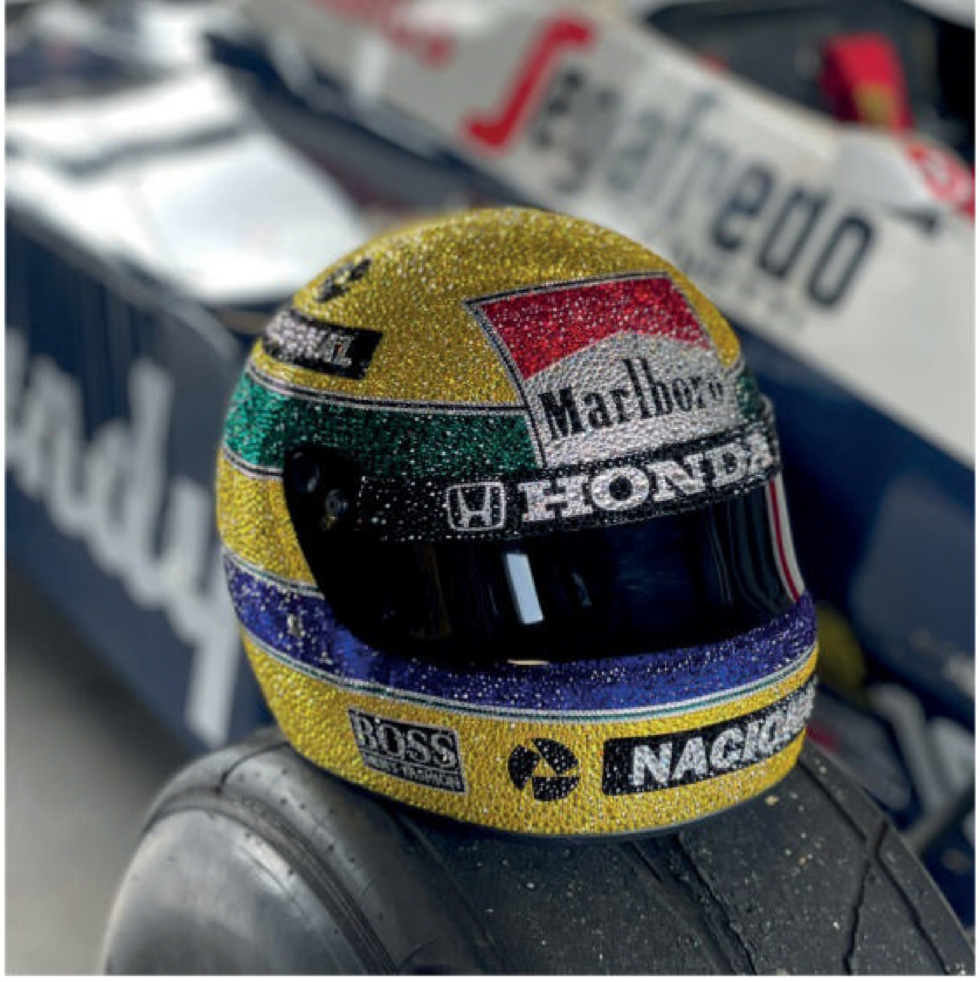
Automotive photographer Neill Bruce entered Ferrari's orbit in 1971 when he shot a Dino 246GT. The results made such an impact on Ferrari's UK importer that Bruce became its de facto in-house snapper. Founded by sometime F2 team owner Colonel RJ 'Ronnie' Hoare in 1960, Maranello Concessionaires was Ferrari's first 'proper' UK importer – until that point Enzo had only sold a handful of cars into the territory. It remains in business as Ferrari UK.

During his association with the company Bruce not only photographed Ferraris on British soil, he visited the factory, Fiorano test track and the Scaglietti coachbuilding workshop in Modena. This book reproduces those evocative trips as well as presenting a historic catalogue of evocative cars, including the F40, 288 GTO and Testarossa.



50 YEARS WITH FERRARIS

Photographer Neill Bruce's story of a lifetime working with Maranello Concessionaires



AYRTON SENNA CRYSTAL HELMET BY STOKESI

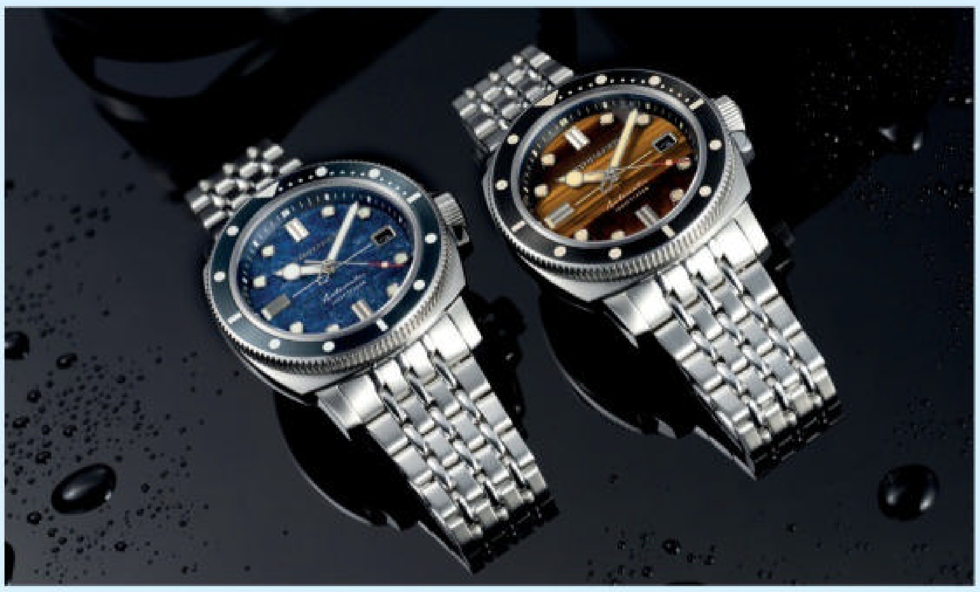
Artist Tracy Stokes

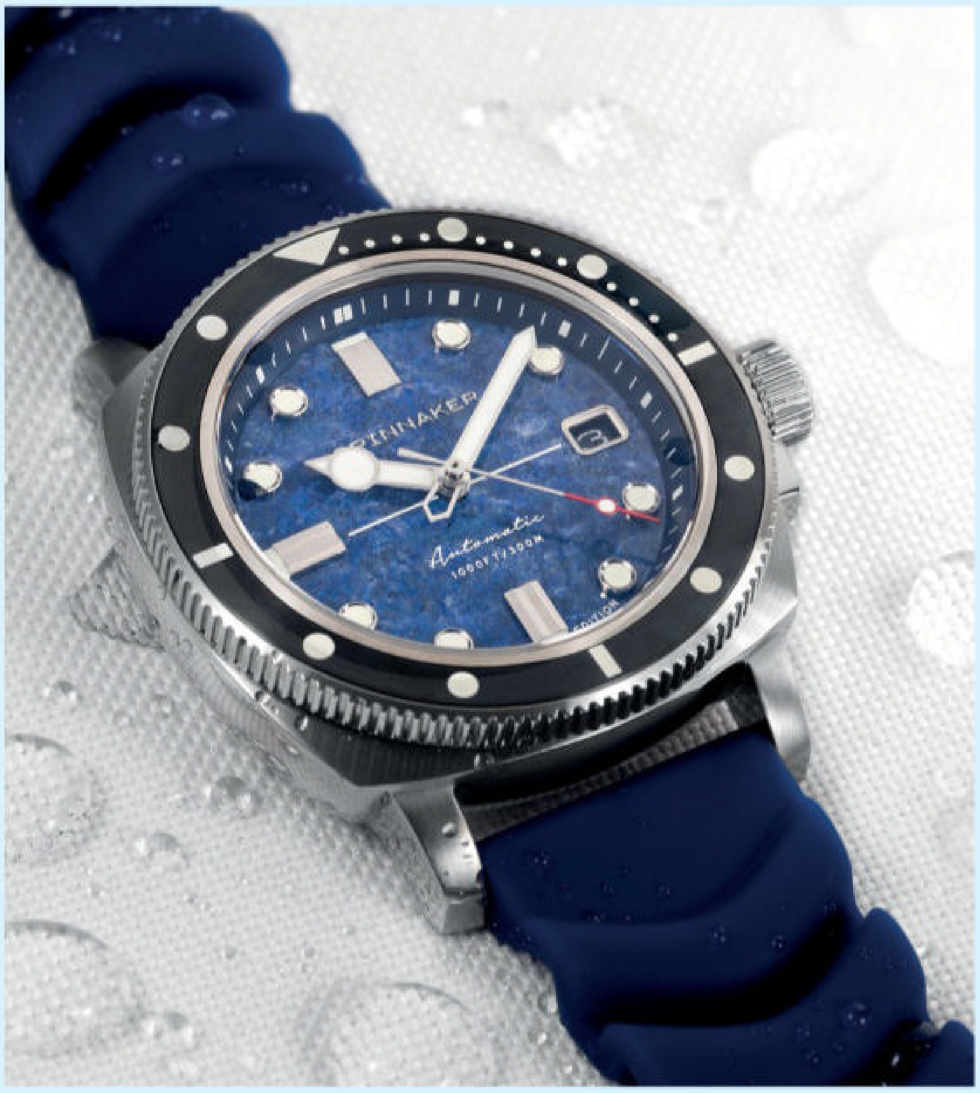
Price £60,000

serpinifilms.com

If you attended the Donington Historic Festival this year you might have seen the first public display of the remarkable Ayrton Senna Crystal Helmet by 'STOKESI', crystal artist Tracy Stokes – a long-time fan of Formula 1. Taking around 1800 hours to create, the full-size replica of Senna's helmet as worn in the 1988 Japanese Grand Prix (where Ayrton won his first world championship) is encrusted with 49,104 Swarovski crystals in six different colours and a plethora of sizes.

In July another full-sized Ayrton Senna Crystal Helmet by the same artist will be presented to the Senna family and placed on permanent display at the Ayrton Senna Museum in São Paulo, Brazil. Officially licensed by Senna Brands, 10 further pieces will be produced for sale on a first-come, first-served basis. Given the lead time involved in creation, orders taken now will be delivered in early 2024.





SPINNAKER HULL COMMANDER LAPIDARY LIMITED EDITION

Price £520

spinnaker-watches.com

The aquatic-themed timepiece brand has introduced a new dive watch range, with a launch collection in two limited editions and featuring unique and semi-precious dial faces. The Spinnaker Hull Commander Lapidary has a 42mm solid marine-grade stainless steel cushion-shaped case with a scratch-resistant sapphire lens enclosing a unique dial hand-finished from a choice of two natural gemstones. The Lapis Lazuli is striated with intense blue colouration while Tiger Eye has a warm, luminescent appearance.

The robust stainless steel bracelet is interchangeable with an accordion-shaped non-allergenic vulcanised rubber strap for aquatic expeditions; the Hull Commander Automatic is water-resistant to 300m.

A Seiko TMI NH35 movement enables a slimline form factor and light weight, with a 14mm overall thickness. Each colourway is limited to only 250 pieces.

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FULL THROTTLE MUSINGS WITH **MATT KEW**

PICTURES motorsport IMAGES

IT'S TIME TO SQUARE THE (RUBBER) CIRCLE

You'd forgive Lewis Hamilton for wincing any time he hears the words 'Pirelli' and 'Silverstone' uttered in the same breath. His attempt to convert pole into a home victory during his maiden Mercedes campaign in 2013 was scuppered by his left-rear tyre exploding. Seven years later he crossed the line to land his seventh British Grand Prix triumph, albeit with the front-left rubber in tatters.

But he *shouldn't* face another similarly sticky situation this month. Pirelli will use the trip to Northamptonshire to introduce a new construction which has most recently been tested in Barcelona. Concerned by increasing downforce levels and cornering loads, the tyre maker has fast-tracked a specification originally intended for 2024. The bumf says compounds and profiles will stay the same, but the material will be even more resistant to fatigue.

In first practice for the recent Spanish GP all teams were able to test a hard version of Pirelli's new tyre construction

Pirelli motorsport director Mario Isola tells *GP Racing*: "We wanted to give teams a construction which was transparent. If you compare it with the current one, it is just more resistant because of the material we want to introduce into the construction. We collected feedback from the teams [after testing of the prototype] and most of them said it was 'no change' or 'no difference'."

By virtue of the tyres being more robust, Hamilton and his peers are less likely to pay tribute to The New Christy Minstrels by finishing with only three wheels on their wagons. However, that also means there's little to suggest the British GP will buck the trend of 2023 and its largely tepid racing. Too much of this season has been dictated by drivers backing off from the car ahead to bring down tyre temperatures. That's different to Pirelli's original brief. When it entered Formula 1 in 2011, there was the hope of developing a tyre that would deteriorate markedly to pave the way for diverging strategies and thrilling contests, like that of the 2010 Canadian GP.

The first round of rubber did indeed have all the resilience of a chocolate teapot. Now, though, it's thermal management rather than true degradation that has become the limiting factor. That's why after the cut and thrust of the first few laps, drivers very soon separate by two-second intervals as they ease off and find cooler air. This prevents overtaking, whether it's a cheap DRS manoeuvre or a prolonged wheel-to-wheel dice. Arguably, even worse, it hurts any potential for an overtake. Drivers don't necessarily have to be trading places ad nauseam but too often now, they're not even in the same camera frame.

> NOW, THOUGH, IT'S THERMAL MANAGEMENT RATHER THAN TRUE DEGRADATION THAT HAS BECOME THE LIMITING FACTOR

Esteban Ocon demonstrated another problem with the current rubber in Azerbaijan. He started on a set of hards and nursed them to the final lap before making his mandatory stop to avoid disqualification. The only drama for Ocon was having to steer around a gaggle of photographers who were released early into a still-live pitlane.

It seems the cycle is nearing completion. For it was this kind of tedious durability from the old Bridgestones that detracted from the spectacle sufficiently to prompt F1 to ask Pirelli to deliberately design in some fallibility. The irony is that this time, it's Bridgestone that has just made a bid to the FIA to challenge its Italian rival in the 2025 tyre-tender process.

Worth six times as much as Pirelli (£24billion plays £4bn), Bridgestone could truly dedicate the resource required to fulfil the inevitable 'Goldilocks' design brief: tyres that are resistant enough to allow drivers to push, aren't so sensitive to temperature to dash all hopes of overtaking, yet still degrade to keep the strategists on their toes.

PICTURE: MARK SUTTON. ILLUSTRATION: BENJAMIN WACHENJE

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